TELEPHONY

THE JOURNAL OF THE TELEPHONE INDUSTRY

JUNE 21, 1941

VOLUME 120

NUMBER 25

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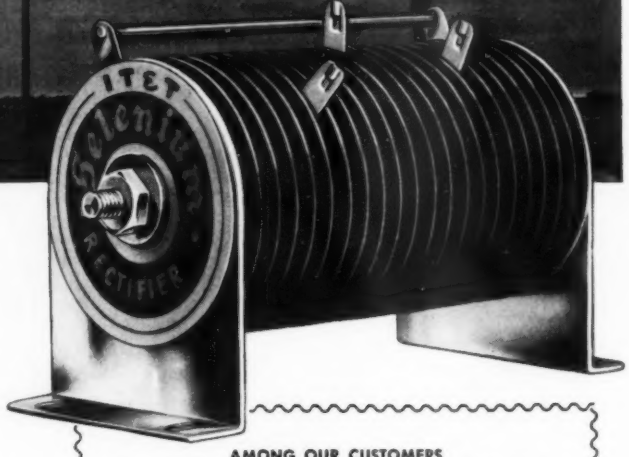

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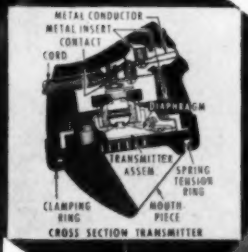

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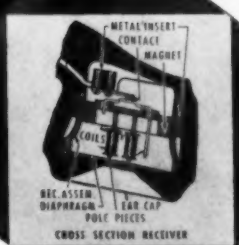

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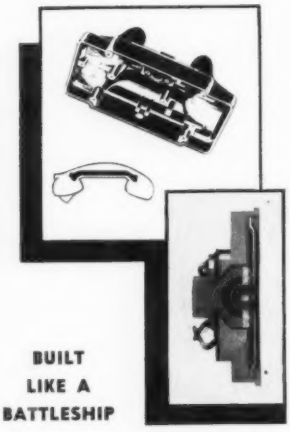
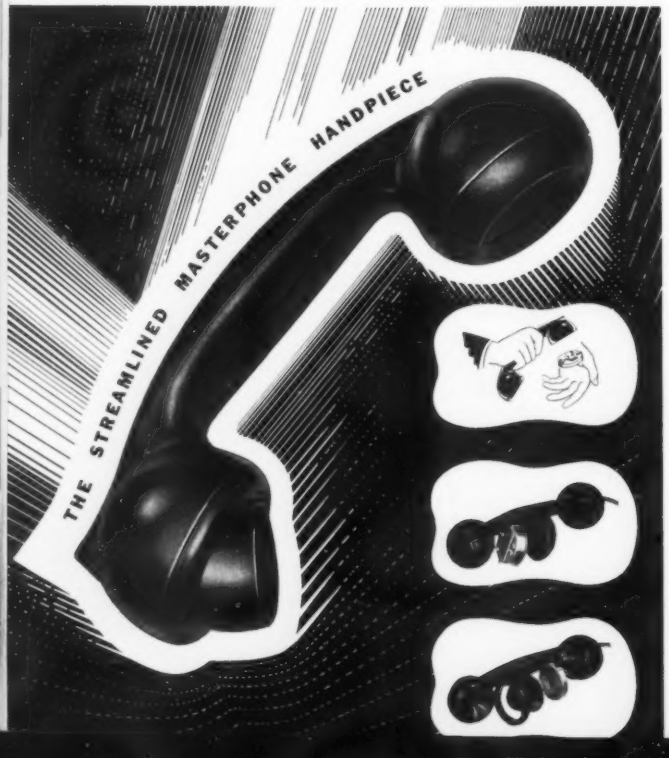


BUILT LIKE A BATTLESHIP

A glance inside the base tells the story. Here, molded of solid Bakelite, are extra supports, inserts and extra wall thicknesses. These reinforcements are provided at every possible point of strain. The handpiece diagram shows the heavy metal reinforcing bars, which are molded through the solid Bakelite center. These are the conductors which eliminate the usual hole through the handle and the nuisance of threading through the cords. A cross-section view of the famous NON-POSITIONAL transmitter typifies Kellogg rugged design and construction.



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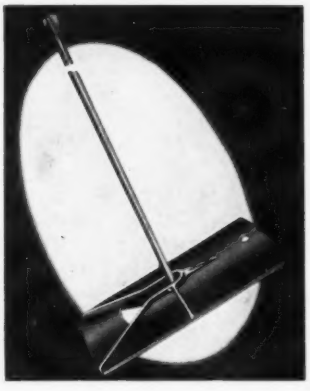

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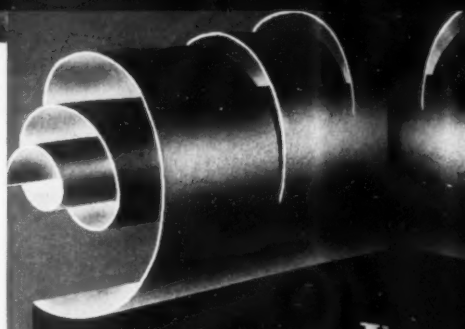

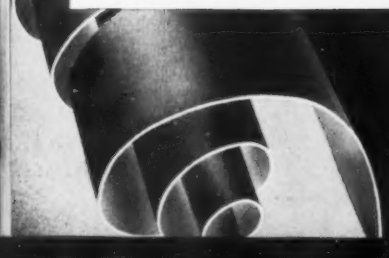

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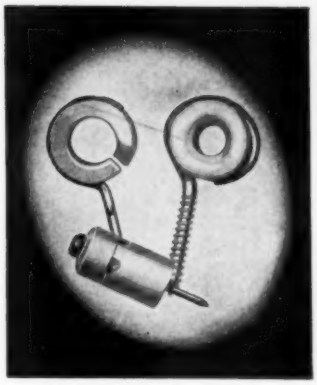

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TELEPHONY

The Journal of the Telephone Industry

June 21, 1941 **Vol. 120, No. 25**

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Fluorescent Lighting Ideal

FOR TELEPHONE EXCHANGES

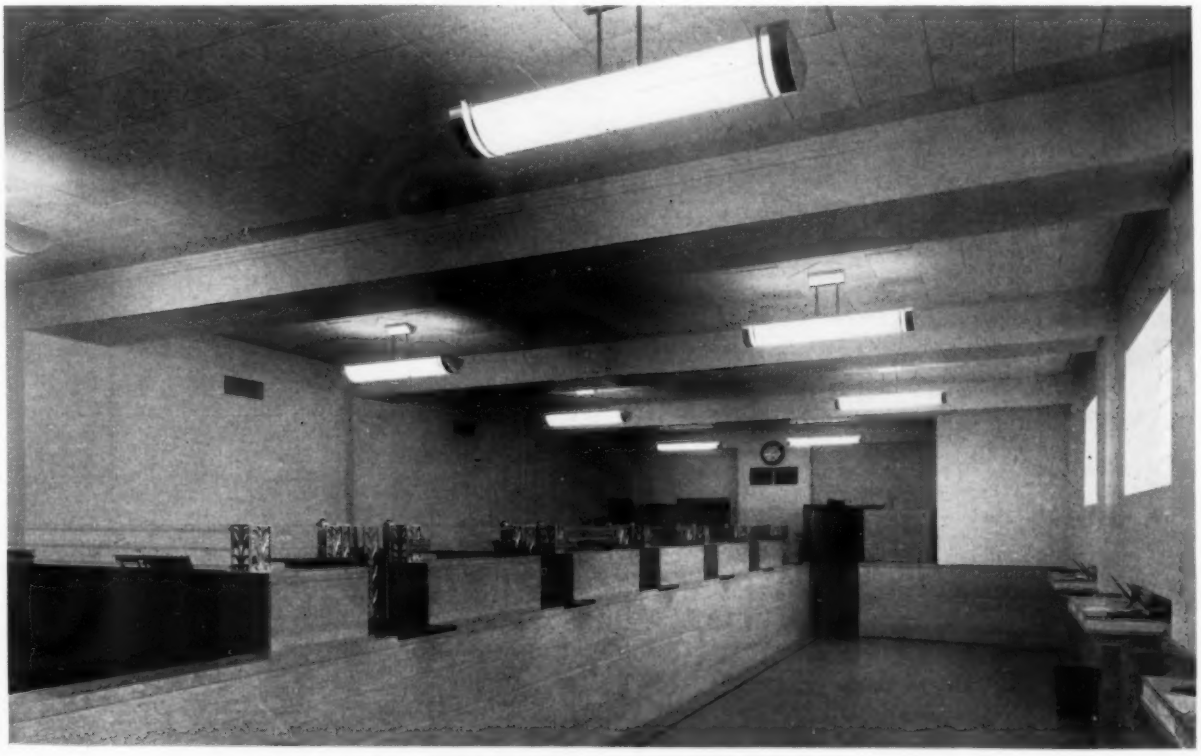
By RAY BLAIN

Improved fluorescent lamps—having large light area, low heat radiation, minimum power consumption, and being free from glare—make such installations particularly advantageous for use in commercial offices, operating and terminal rooms

TO DISPEL darkness by a light source which approximates natural daylight has long been the dream of illumination engineers. Daylight has ever been the standard toward which inventors and engineers have been striving for the past 60 years. First came the ordinary incandescent lamp, then the gas-filled lamp, the inside-frosted bulb, the mercury vapor lamp, and more recently the fluorescent daylight lamp.

It is believed that modern fluorescent lighting has numerous features which make its use in the telephone exchange an advantage. These features will be explained briefly so that telephone men may become familiar with its advantages.

The fluorescent lamp possesses certain characteristics not available in other types of light now in general use, although the latter also have their good points. This light has a large area, low brilliancy source which permits diffusion without the use of complicated equipment. While fluorescent light cannot be projected a long distance, low mounting fixtures can be used to advantage. Due to the fact that



This installation of fluorescent lighting would be well-suited to a telephone business office.

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this is a long light source, shadows are not harsh even when the fixtures are mounted near workers as on the face of a switchboard.

The fluorescent lamp consists of a tubular bulb with an electrode sealed in each end. The current flow takes place through mercury vapor. In the filament type lamp, electricity flows from one lead-in wire to the other through the tungsten filament, heating it to incandescence. In the electrical discharge lamps, the two electrodes are separated from each other with no apparent connection between them. When a proper voltage is impressed on these electrodes, a flow of negatively-charged electrons is driven from one electrode and is pulled or attracted to the other.

This flow of electrons will take place either in a vacuum or a gas. In the presence of gas or vapor, the electrical path is of lower resistance and the discharge will take place at a lower voltage.

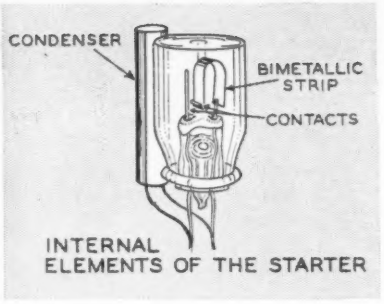
Luminescent Gas

The ability of a gas to become "luminescent," or to give off light under the influence of the electron flow through it, is due to a "collision" of the fast moving electrons with the atoms of the gas which is as real as two automobiles colliding on a highway. Due to these collisions, there is a state of excitation and the excited gas produces light. Light is produced from the energy given up as the disturbed molecule, atom, or ion settles down to its stable or neutral state.

Various types of electrical discharge sources have been available for a long time. The most commonly used ones employ neon, mercury and sodium vapor. Other gases, such as argon, helium, carbon dioxide, xenon and various other metallic vapors such as zinc cadmium have been used either commercially or experimentally.

The fluorescent lamp, without its coating of powder, is essentially a glass tube containing a drop of mercury and argon gas to facilitate starting. This principle is identical to that used in the Cooper-Hewitt mercury vapor lamp which has been commercially available for many years. Mercury is used as the conducting vapor because of its efficiency in the production of ultraviolet radiation that activates the phosphors which are coated on the inside of the bulb.

Fluorescent lamps require auxiliary equipment consisting of two



Drawing of automatic starter.

separate elements — an iron core choke coil which limits the arc current, and a starting switch which momentarily closes and then opens the electrode heating unit. Each lamp requires separate auxiliary equipment although the elements for two lamps may be housed in a single container. Specially designed ballast equipment is also required for each wattage size and for each frequency and voltage range.

The first fluorescent auxiliaries had both the switch and ballast choke in the same case. Two types of auxiliaries were then available—the thermal and the magnetic types. The thermal type operated on the common socket flasher principle while the magnetic switch had a simple "door bell" type of magnetic contactor. Auxiliaries with built-in switches are no longer listed, but may be obtained on special order, when required, for certain applications.

The moving parts of the automatic starting switch make it the element most readily subjected to trouble. Formerly, a faulty switch meant tearing up the unit and replacing the complete auxiliary. The new system utilizes the replaceable starter, simplifying wiring and makes switch trouble easier to locate.

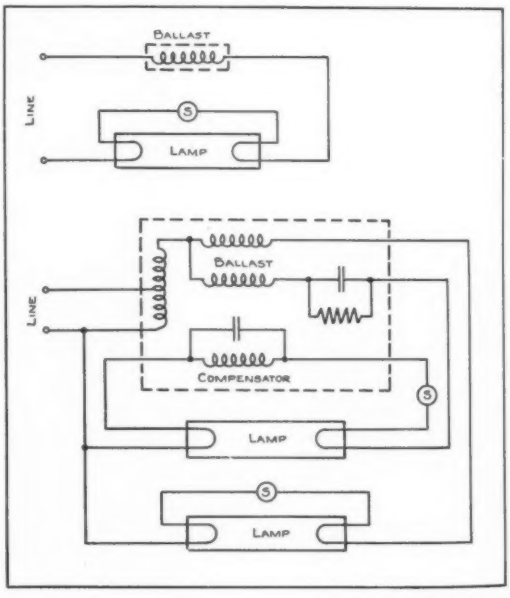
Various designs of automatic starting switches are possible, but the most popular of the present designs consists of a thermal glow switch and a radio interference eliminating condenser mounted in a small aluminum can. In starting, the voltage at the starter is sufficient to produce a glow discharge between the bimetal and the center electrode, the heat causing the bimetallic strip to complete the lamp cathode heating circuit. Because the glow discharge is shorted out, the contacts soon open and the inductive kick from the ballast starts the lamp.

The voltage at the starter is sufficient thereafter to cause the switch to operate so that the starter consumes no energy during the lamp operation.

Lamp Ballast

The fluorescent lamp ballast consists of a coil of wire wound on an iron core. This coil is connected in series with the lamp to limit the current. Ballast coils are designed for use with each size of lamp. "Tulamp" ballast uses the split-phase principle with one of the lamps ballasted by inductive reactance only and the other by inductance and reactance in series.

The well known "transformer hum" is inherent in lamp ballast



Wiring diagram showing how to wire one-lamp and two-lamp circuits.

ABOVE: For a commercial or accounting office the recessed troffers, shown in this photograph, make a neat installation and provide a highly efficient quality of illumination. In the office shown, the recessed troffers are mounted on 5 ft. by 6 ft. center spacings to afford wide light distribution and even illumination. Full-screen diffusion is accomplished with glass shields.

ABOVE: The type of fixture used in this installation spreads 25 foot candles of soft, even light over the counters of the modern super-market shown. It would make a neat installation for a telephone office.

LEFT: Another installation of fluorescent lighting utilizing the hanging fixtures, which would be especially suitable for use in a plant department.

equipment and may vary considerably with individual ballast. This hum comes from the magnetic action in the choke coil elements which is aggravated when these vibrations are transferred to the supporting structure. By mounting auxiliaries on soft rubber or similar non-rigid material, the hum will be reduced to a minimum. Recent improvements in ballast construction has helped reduce the hum to a low level and it is now hardly noticeable with approved type fixtures.

The fluorescent lamp is undoubtedly the most efficient light source available today. With tulamp ballasts using replaceable starters, a 1 per cent variation in line voltage will change the lumen output only about 1 per cent. One example of the efficiency of this new light source is as follows:

A 500-watt filament lamp will produce 10,000 lumens and has an average life of 1,000 hours. The 40-watt fluorescent lamp produces 2,100 lumens and has a 2,500-hour average life.

Confusion is often expressed that fluorescent lamps produce cooler foot candles than do incandescent lamps. While we all know it is true that a kilowatt-hour represents an over-all heating effect of 3,414 BTU's regardless of how it is consumed; however, the reduced sensation of heat from fluorescent lamps is due to the fact that only about 25 per cent to 35 per cent of the energy is radiated as heat compared with 60 to 75 per cent for the gas-filled filament type of lamp.

It is a fact that fluorescent lamps give only one-quarter of the radiant heat and one-half the total heat of incandescent lamps of the same output. This reduces the heat from the light source to a point which proves a real efficiency when a telephone exchange is air-conditioned.

The fluorescent tubes are furnished in five different colors, i. e., blue, green, gold, pink and red, although the white and daylight are the only ones considered suitable for use in the telephone exchange. The daylight type produces the nearest approach to actual daylight which has ever been attained in any artificial light source. The development of the white lamp has been brought about by the need in some locations of a lamp to produce light of a warmer color than the daylight type.

The efficiency of the white lamp is also somewhat greater than that of the daylight. It is generally preferred unless the requirements are such that light of daylight quality is necessary.

It is quite apparent that the fluorescent lamp has numerous applications in the telephone field. The large light source, low heat radiation and shadowless, glare-free light makes it ideal for mounting on manual switchboard positions. The 15 or 20-watt lamp usually provides adequate light for one operator's position. Small bracket fixtures may be obtained which mount the lamp neatly on the switchboard.

This type of lighting is also especially desirable for use in terminal

(Please turn to page 37)

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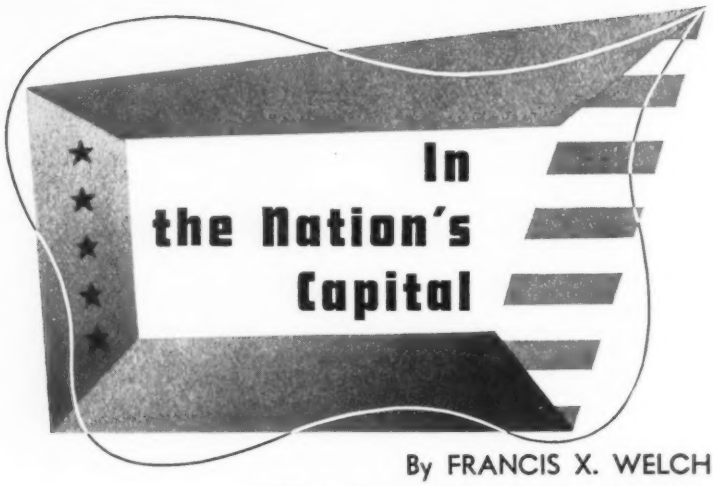

By FRANCIS X. WELCH
Washington Correspondent for TELEPHONY

Senate Committee hearings on FCC radio network monopoly order discussed by correspondent, who predicts that commission will defer action. . . . Telephone, electric and radio industries seek better priority rating. . . . USITA sets forth need for higher classification in telegram to OPM

THE SENATE Interstate Commerce Committee hearings have followed a rather uncertain and unpredictable course. Nobody seems to know, at this writing, definite answers to the following questions: *Is the administration (as distinguished from FCC Chairman Fly) really opposed to a more thorough inquiry into the FCC and radio regulation? Is Senator Wheeler (chairman of the committee) really in favor of such an inquiry? Do the radio broadcasters really want it?*

When the preliminary hearings over the White resolution opened earlier this month, it was generally thought (1) that Chairman Wheeler would back up the White resolution 100 per cent, (2) that the administration would approve it almost 100 per cent, and (3) that the radio industry, while admittedly taking a chance of leaping from a regulatory frying pan into an investigation fire, would also pull hard for a good, old-fashioned laundry job on all the dirty linen that could be turned up in the radio field.

Now, after nearly three weeks of testimony, we are not so sure of any of these things. About the only thing we are sure of is that Chairman Fly is dead set against an investigation. He said so the first day and has maintained his position ever since.

Senator Wheeler furnished the most ground for speculation when he came out in support of the FCC's anti-monopoly report against the radio networks. Since that report is chiefly the basis for the current row over the FCC, the Montana senator caused quite a lot of head-scratching among the radio broadcasters.

They also are suspicious of a certain amount of New Dealish support of the inquiry which has been turning up in a very discreet way. There is evidence of back-of-the-scenes wire-pulling. They are beginning to suspect that, if the Senate probe is finally approved, it will be the radio industry, rather than the FCC, which will be cast in the role of the defendant.

So far, the testimony has not been very surprising. Chairman Fly did a swell job of defending the position of his commission. The senators were impressed. The affable Texan, on the senate stand, seemed to have regained all his old charm, calm and canniness. Listening to his pleasantly sleepy drawl (which is deceptively effective for persuasive purposes), it was hard to believe that this was the same chap who blew his top several weeks ago out in St. Louis. Yet he really presented no new or startling facts. At least, none of them were new to those who have been following FCC-radio affairs very closely.

The radio men brought forth an eminently respectable representation of character witnesses, so to speak. There were the various educational and religious parties who fear that Maestro Toscanini might be banished from the air waves, or that the tempted souls of the American hinterlands might find the sawdust trail barred if the big brotherly networks were bound by the proposed FCC bureaucratic restraint. But Senator Wheeler was not impressed. Replying to a protest of 62 clergymen that the FCC network regulations would imperil "all programs of religious broadcasting," the Montana Senator stated, "That protest is typical of the misinformation that gets out with every piece of legislation, or anything else in Washington."

On the whole, the case made out before the committee against the

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FCC has not been entirely convincing. The attempt to smear the FCC with charges of political favoritism fell rather flat. Your correspondent says this advisedly and without venturing any personal opinion as to whether there is or is not a particular state of political favoritism in the FCC's handling of radio affairs. He merely reports that the evidence to date on the subject is hardly conclusive.

More interesting was the charge that the radio broadcasting industry is biased in its presentation of news and views on foreign policy. This, of course, is a charge against the radio networks as distinguished from the FCC. However, the FCC was sensitive to the charge. It may do something in the future to cut down on the amount of biased editorializing that goes on the air under the label of news reporting.

Sen. D. Worth Clark (Idaho) said at one session of the committee that 75 per cent of the news reports of the commentators consisted of "wildly biased editorial tirades." He believed stations should be made to specify that the commentators were expressing opinions and not merely adhering to straight news accounts.

Sen. Charles W. Tobey, Republican (an isolationist, of New Hampshire), asked Fred Weber, general manager of the Mutual Broadcasting System, if he could name one commentator who "was not an interventionist." Mr. Weber said that Fulton Lewis, Jr., a Mutual commentator, could not be considered an interventionist. Subsequently, Senator Clark said that in the case of Mr. Lewis it would be fairer not to identify him with either the isolationist or interventionist camp but to describe him as one of the few commentators who gave both sides of an issue. "Not like (H. V.) Kaltenborn," added Senator Clark.

Senator Wheeler said that, in general, radio should be praised for widening the channels of free speech. He said many newspapers had been forced to treat news more impartially because they knew their readers would hear opposite viewpoints on the radio.

* * *

But getting back to the real purpose of the inquiry, the evidence all seems to indicate that the real trouble is an honest difference of opinion over the commission's powers under the Communications Act. The network executives take the position that Congress did not intend to permit the FCC to make up its own basic policies as it goes along. There is considerable legal authority for that position.

There is also considerable authority for the position of the FCC's majority that it was the intention of Congress that the commission should reach its own conclusions of policy as long as it is able to do so within reasonable limitations of the statutory text of the Communications Act. In other words, it is a pretty close question.

Commissioner Craven of the FCC appeared before the committee on June 12 to give the minority viewpoint. His statement, which was to the effect that the FCC order would create a greater monopoly than the majority members sought to eradicate, was endorsed by another FCC member, Commissioner Case.

Mr. Craven accused the majority of adopting "a narrow definition of monopoly" and challenged its right to decide in the first place whether a monopoly existed. He held to the belief that the commission had a right to act on a monopoly only after it had been determined by a court that there was an illegal restraint of trade.

"I think the commission should have made recommendations to Congress rather than put the rules into effect," Mr. Craven said. Under existing law, Mr. Craven continued, the commission had a choice of two courses in dealing with monopoly. Either it could ask Congress for special legislation to adjudicate the matter, he said, or it could turn over its findings to the anti-trust division of the Department of Justice.

Mr. Craven said he and Mr. Case acknowledged that abuses existed in broadcasting and that "we need more competition." He added that a preponderance of the country's radio stations was in the hands of the National Broadcasting Co.

* * *

Well, what is going to come of all this? Frankly, your correspondent can only guess. It is a little too early to make a very good guess, but here goes: First, the FCC will probably defer its own radio network monopoly order before its effective date on August 2. This will give the Senate committee more time if it wants to investigate further. It would also give all parties more of an opportunity for compromise and rearrangement.

The second guess is that some sort of an investigation will be authorized. But your correspondent is of the opinion that it will be directed more towards the mechanics of radio regulation than against the FCC as a bureaucratic usurper of statutory authority. In other words, the White resolution will probably be toned down.

(Please turn to page 34)

The antique telephone exhibit at the recent Pennsylvania convention was very interesting to visitors. These two snapshots taken by Ray Blain, technical editor of TELEPHONY, show some of the old telephones on display, together with two attractive visitors: ARLENE SHAKELY of Butler is at the left and RUTH PARKER, also of Butler, is on the right.

XUM

By HARRY CHAPMAN

Elements OF THE TELEPHONE

Part V. Telephone transmitters are discussed in this installment of a series, covering the various parts of the telephone, which has been especially written for the telephone worker who is either new on his job or wants to become more thoroughly versed in telephone fundamentals. (Part I appeared November 23, 1940; Part II, January 25; Part III, March 15; Part IV, April 5.)

THE purpose of a transmitter is to convert sound waves into electric waves or energy by the action of the sound waves upon a sensitive diaphragm which, in turn, causes a variance of pressure upon the carbon granules in the transmitter button which is mounted upon the diaphragm. Battery power is supplied through one electrode, through the carbon granules to the other electrode, the induction coil and back to the battery.

When sound strikes the diaphragm of a transmitter connected in an electric circuit, the diaphragm is forced away from the sound, causing the carbon granules to be compressed, permitting an increased current to flow through the circuit. As the sound waves recede or fall away, the diaphragm moves back to a little beyond normal, due to the pressure of the damping springs and the diaphragm's very slight momentum, and then returns to its normal position. Thus, a rising and falling current commonly called "voice current" flows through the transmitter.

Referring to Fig. 1, we can obtain a better understanding of the operation of a transmitter. At "A" we have the diagram of a transmitter with battery connected and current passing through it. To the left of "D", is a vertical line showing the current in milliamperes.

At the point on the scale marked "150" we show a heavy line representing the amount of current passing through the transmitter when it is not affected by sound waves (the condition as shown at "A"). In the average good transmitter, this current should be approximately 150 milliamperes.

At "B", the diaphragm is shown curved, the condition which exists when the transmitter has been subjected to a sound wave. The carbon granules are compressed, giving more contact surface and thus permitting more current to flow from one electrode to the other. This rise in current flow is shown at "E," which is indicated as 175 milliamperes. The current, of course, is entirely dependent upon the volume of the sound waves. We have taken 175 milliamperes merely as an illustration.

As the sound wave falls away, the diaphragm will become curved in the opposite direction, as shown at "C", due to its momentum and the slight pressure exerted by the damping springs. When this condition exists, the carbon granules will be decompressed, reducing the contact surface and hence decreasing the flow of current from one electrode to the other.

This drop in current is shown at "F", which we have shown as being 125 milliamperes. As soon as the transmitter is free from sound waves, the diaphragm will return to normal, shown as 150 milliamperes.

Although this "current flow chart" greatly resembles that of a sine wave of pure alternating current, the latter rises and falls from a "zero" point in one direction, then in the other. The current in a complete transmitter circuit, however, rises and falls from a given amount of current (in this case 150 milliamperes) and does not reach zero at any time as long as the circuit is complete.

"Voice current" produced by a transmitter is a pulsating or fluctuating direct current and is not converted to a form of alternating current until it passes through the induction coil, as we found in our study of induction coils (March 15 and April 5 issues).

We are all familiar with the construction of a transmitter, but perhaps some of the parts merit discussion. In one type of transmitter, the manufacturer employs a rubber ring or gasket as a means of sealing the sound chamber. This ring fits around the outer edge of the diaphragm and lies against the inside of the face of the transmitter, permitting no sound to pass to the back of the diaphragm. It also serves as a pivot for the diaphragm allowing free action when the diaphragm is actuated by sound waves entering the sound chamber through the mouthpiece.

Another manufacturer uses a treated paper or linen gasket as a seal for the sound chamber. With this type of gasket, the outer edge of the diaphragm is "turned" to serve as a pivot. With either type, the diaphragm is held in place by damping springs. As long as the gasket is soft and in a pliable condition, the transmitter will give good results, assuming that the carbon button is also in good condition.

The damping springs play a greater part than is sometimes supposed.

XUM

Although the method of mounting and the location of these springs vary in the different types, their action is the same. Their purpose is not only to keep the sound chamber sealed, but also to retard the momentum of the diaphragm. Otherwise, there would be overtones or echo produced by the transmitter. The springs also tend to hold the transmitter button open, permitting a greater range of vibration than would otherwise be obtained.

Transmitters of modern design are built to operate on a maximum current of approximately 250 milliamperes. On subscriber's loops up to about 600 ohms resistance when the battery feed is essentially the same, this is well within the operating range of the average telephone line. Special transmitters may be obtained to operate on lines where the resistance is known to be too high for satisfactory operation with the regular equipment.

In the schematic diagram of Fig. 2-A, we show the most elementary type of telephone circuit, namely, transmitter, receiver and battery. The amount of current flowing through the transmitter and receiver when no sound waves actuate the transmitter is represented at "J". Due to the current flowing through the electro-magnets of the receiver "R", its diaphragm will be pulled slightly toward the poles. Since the diaphragm of the transmitter "D" is not being actuated by sound, there will be no sound coming from the receiver.

As a sound wave strikes the transmitter diaphragm "D" (Fig. 2-B), the carbon is compressed, causing a rise in the current K, which in turn sets up a much stronger electro-magnetic field in the receiver and pulls its diaphragm closer to the poles.

When the sound wave recedes (Fig. 2-C), the carbon granules become less closely packed and the current "L" decreases. This causes a weakening of the magnetic field in the receiver "R", permitting its diaphragm to return to the former position. As the sound waves cause the transmitter diaphragm to vibrate, these, in turn, set up magnetic waves in the receiver causing the diaphragm to vibrate and produce sound identical to that entering the transmitter.

Transmitters are designed so that the speaker's lips should be not more than one-half inch from the mouthpiece. It has been found by experiment that speaking with the lips three inches from the mouthpiece is equivalent to adding about one hundred and forty miles of copper wire to the line. It is sometimes a good policy to carry on an educational campaign among subscribers along with maintenance work. Too many telephone users talk "out the window" or "across the room" instead of into the instrument.

Some of the most common ills of transmitters are packing, noise, and "sucking". Packing in a transmitter is generally due to atmospheric conditions and improper care in manufacturing. Before the carbon granules are sealed in the button, they must be subjected to long hours of baking at high temperatures to insure the removal of all traces of moisture.

When even the slightest trace of moisture is present, the electrodes will produce a form of condensation during humid weather, making the granules and electrodes less sensitive to the pressure produced by the sound waves. The granules will also become packed or tend to cling together.

The only remedy for this trouble is to tap the transmitter gently or remove it from the bell and shake it slightly to loosen the carbon. If the same transmitter gives this trouble several times, it is best to replace it with a new one.

Noisy transmitters are generally caused by scratches or roughness on the highly polished surfaces of the electrode in the button. These can be caused by rough handling. If the transmitter is located in a building where it is constantly subjected to heavy vibrations or sudden jars, then heavy surges of current such as those produced by lightning will cause the highly polished electrode surface to become roughened. Hard and non-pliable gaskets will also cause noisy effects in the transmitter.

"Sucking" is another source of trouble in transmitters. It is caused by the small vent holes near the base of the mouthpiece becoming clogged or partially obstructed. These vents are necessary because many subscribers, when listening on the line, place their hand over the mouthpiece to exclude outside noise.

The pressure of the hand will force the air out of the mouthpiece through the air vents. If it cannot get back in fast enough when the hand is removed, the transmitter diaphragm is drawn out, separating the electrodes and allowing the fine carbon to drop to the bottom of the cup and packing there. This prevents the transmitter from responding to the sound waves freely and causes it to have a "dead" effect. The same remedy applies as for packing. These defects are all reduced to a minimum by the use of the new improved non-positional transmitters.

G. ... care should be exercised when handling transmitters. When they are to be carried on a maintenance truck, they should be well packed and stored in that part of the truck where they are subjected to the least vibration. *(To be continued)*

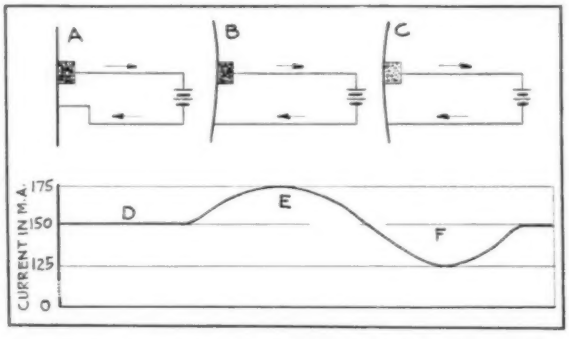

Fig. 1. Current flow in circuit consisting of battery and transmitter when the transmitter is actuated by sound waves.

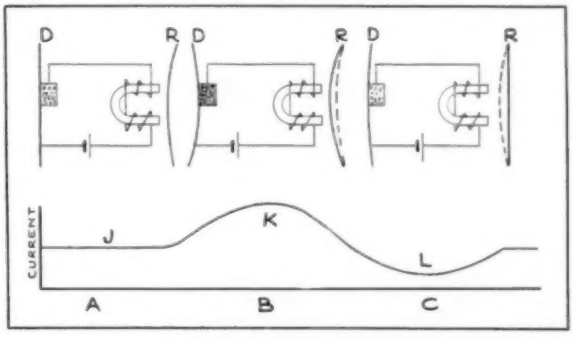

Fig. 2. Action of transmitter and receiver diaphragms and current flow in a simple telephone circuit during talking.

XUM

NEWS of the Industry

New Wage-Hour Ruling Affects Small Exchange Operators

Switchboard operators in exchanges of less than 500 stations, who also perform incidental clerical work as a part of their duties while attending the switchboard, are exempt from provisions of the federal wage-hour law, according to a new interpretation by Baird Snyder, deputy administrator of the Wage-Hour Division.

Mr. Snyder expressed this opinion in a letter, dated June 10, to Clyde S. Bailey, Washington representative of the United States Independent Telephone Association, who has been active in explaining to the Wage-Hour Division the duties of operators in small telephone exchanges.

Heretofore, the division has ruled that if clerical work consumed a *substantial* part of the working time of an operator in a small exchange, she could not be classed as an operator and therefore would not be exempt from the law under the provision exempting operators in exchanges of less than 500 stations.

Mr. Snyder's letter to Mr. Bailey, which definitely makes a practicable interpretation of the wage-hour law in this respect, follows:

"With respect to the operator of the typical small telephone exchange who is exempted from the provisions of the Fair Labor Standards Act and who does work other than operating, the division has heretofore ruled that if such non-exempt work is a substantial part of an employe's employment the exemption would be lost.

"You set forth the fact that such operators do two kinds of clerical work. One is done at the switchboard as a part of the occupation of being an operator. The other is a recapitulation and billing of the record kept while operating at the switchboard.

"Furthermore, at least one of the operators on such switchboards solicits new business and performs other work of a public relations and sales nature.

"Where such an operator puts in a full shift at the switchboard and where such an operator is primarily engaged in operating a switchboard, the fact that the other duties discussed above are performed need not eliminate the exemption.

"On the other hand, where an employe acts in a capacity such that the occupation of being an operator is in fact incidental, the employe would not receive the exemption."

Further Wage-Hour Revisions

Seventy-five per cent of the sales made or services performed by commercial establishments must be retail, instead of 50 per cent as hitherto, to qualify them for exemption from the wage-hour law, the Wage-Hour Division has announced.

A substantial number of the 6,242,000 wage earners employed in the distribution and selling of goods and services are expected to be affected by this new interpretation of the law.

In the future, where wholesale, commercial, and industrial sales, nonretail in character, total more than 25 per cent, the 40 hour week, and the 30 cents an hour minimum wage will apply. The typical department store will continue to be exempt.

▼ ▼

General Telephone Has Larger May Gain

General Telephone Corp. reports for its subsidiaries a gain of 4,485 company-owned telephones for the month of May, as compared with a gain of 3,245 telephones for the month of May, 1940. The gain for the first five months of 1941 totals 20,760 (exclusive of purchases) or 3.90 per cent as compared with a gain of 14,798 telephones or 2.95 per cent for the corresponding period of 1940.

The subsidiaries now have in operation 552,803 company-owned telephones.

Signal Corps Wants Engineers, Physicists

On Wednesday, June 11, Lt. Col. W. R. Lansford, from the office of the Chief Signal Officer, Washington, D. C., visited New York City to interview graduate electrical engineers and physicists with reference to duty as commissioned officers in the Signal Corps, United States Army.

The war department has authorized the appointment of a limited number of second lieutenants in the signal corps reserve. Applicants must be electrical engineers or electronic physicists, and must have had radio experience.

Appointments will be granted to technically qualified men, regardless of their present military status, provided they are unmarried, without dependents, are between 21 and 36 years of age, and can meet the physical standards prescribed for appointment as reserve officers on active duty.

Those who are commissioned under this authority will be ordered immediately to active duty for a one-year period. They will be stationed first at Fort Monmouth, N. J., for a brief course of military instruction, and will later receive training on equipment used by aircraft warning units.

▼ ▼

A. T. & T. Will Train Signal Corps Men

The war department has announced that arrangements have been made with the American Telephone & Telegraph Co. and the Bell System associated companies for the training of carefully selected enlisted men of the Signal Corps in plant schools on telephone company property.

Instruction will be given to installer repairmen, central office repairmen and wire chiefs.

XUM

Defense Discussed at Oklahoma Meeting

Opening with a salute to the flag, the Oklahoma Telephone Association's district meeting at Sulphur, June 7, centered about the patriotic theme of national defense. H. W. Hubenthal, secretary of the association, outlined some of the methods by which the organization is cooperating in the national defense program.

He referred particularly to activities of the Oklahoma association in gathering information for maps showing the location of telephones to assist the war department in organization of its aircraft warning service.

"The most effective cooperation with national defense departments and organizations can be attained through state and national associations and Oklahoma is doing its share in this respect," said Mr. Hubenthal.

C. E. Devin of Apache, president of the association, urged telephone companies to take advantage of association services, which are always available He outlined the successful efforts of the Oklahoma association in preventing the passage of much legislation which would have been harmful to the industry, and commended the telephone people for their willingness to appear before legislative committees to present the telephone industry's viewpoint on pending bills.

Frank Crawford, owner and manager of the Sulphur Telephone Co., was host for the meeting, which was attended by 43 operating people, manufacturers' sales representatives and prominent citizens of Sulphur. At the noonday luncheon the address of welcome was made by B. F. Keith, secretary of the Sulphur Chamber of Commerce, and responded to by J. P. Gibson, manager of the Western Telephone Co., Elmore City. L. A. Presson, mayor of Sulphur, and L. B. Day of Sulphur, talked on telephone service from the city and rural users' standpoints. L. M. Baker, district manager, Southwest Telephone Co., Purcell, responded from the telephone manager's standpoint.

"Most telephone companies can take care of more local and toll business than they now have, but in order to secure it they must give accurate and pleasing service," said Miss Alma I. Bates, operator for the Southwest Telephone Co., Purcell. The chief responsibility for knowing the people and handling them properly rests on the operator, Miss Bates declared.

The meeting was followed by an inspection of the outside plant and modern central offices of the Sulphur Telephone Co. Many delegates remained over Sunday to attend the season's opening of Platt National Park, which adjoins Sulphur.

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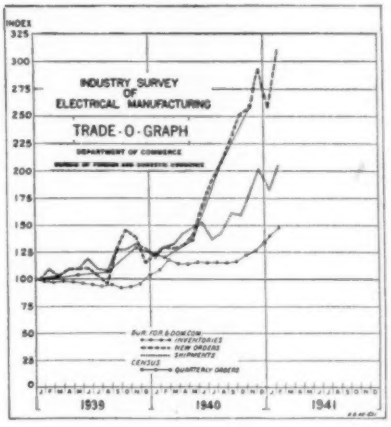
Exports of Electrical Equipment Rise

Exports of electrical equipment for the month of March were valued at $12,587,564 compared with $10,919,912 for February and $12,971,734 for March, 1940, according to the Bureau of Foreign and Domestic Commerce, of the U. S. Department of Commerce.



First quarter 1941 shipments to foreign markets were valued at $36,507,516, increases of 6.4 and 48.0 per cent compared with the corresponding totals of 1940 and 1939 of $34,321,681 and $24,672,867, respectively.

Telephone and telegraph apparatus, with parts for such equipment, was valued at $401,086 in March, compared with $369,417 in February, an increase of 8.6 per cent.

Radio apparatus sold abroad in March was valued at $2,431,183, compared with $1,705,597 for the previous month, an increase of 42.5 per cent. Radio receiving sets sold to foreign customers in March, 1941, were valued at $1,106,586, an increase of 32.8 per cent from the February figure of $833,248. Exports of transmitting sets, tubes and parts were recorded at $493,652 in March, 1941, one of the heaviest months in recent years, and an increase of 25.9 per cent from the February total of $392,147.

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Directors of I. T. & T. Corp. Are Re-Elected

At the annual meeting of the stockholders of the International Telephone & Telegraph Corp. held in Baltimore, Md., May 28 all directors were re-elected as follows: Arthur M. Anderson, Sosthenes Behn, F. Wilder Bellamy, Daniel C. Borden, John W. Cutler, Charles E. Dunlap, James E. Fullam, John L. Merrill, Walter E. Ogilvie, Henry B. Orde, Samuel G. Ordway, Frank C. Page, Bradley W. Palmer, Henry M. Pease, Frank W. Phelan, George E. Pingree, Wolcott H. Pitkin, Lewis J. Proctor, William F. Repp, Kenneth E. Stockton and Mark A. Sunstrom.

At a special meeting of stockholders held the same day, the by-laws were amended to provide for reimbursement of reasonable costs and expenses incurred by directors and officers in defending themselves against suit except with respect to matters as to which they are adjudged liable for dereliction or negligence and also providing for reimbursement under limited conditions if the suit is settled.

Arthur Andersen & Co. were appointed auditors for the ensuing year.

▼ ▼

121,600 Is Bell System Gain for May

There was a gain of about 121,600 telephones in service in the principal telephone subsidiaries of the American Telephone & Telegraph Co. included in the Bell System during the month of May, 1941.

The gain for the previous month was 112,500 and for May, 1940, 86,600. The net gain for 5 months this year totals 605,400 as against 430,900 for the same period in 1940. At the end of May this year there were about 18,088,300 telephones in the Bell System.

The gain for May, 1941, was the largest for the month of May in the history of the Bell System, the next largest May gain having been 95,738 in 1937.

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"Keep 'Em Flying" Is New Defense Slogan

A new slogan, "Keep 'Em Flying," is rapidly coming into use as an everyday expression throughout the country, particularly by government employes and others engaged actively in the war defense program. "Keep 'Em Flying" is an "expression of felicity and high morale," and is intended to be used in place of such expressions as "So long," "Goodbye," and "I'll be seeing you."

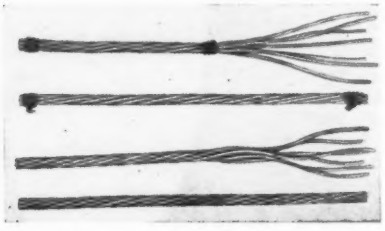
The U. S. Army Recruiting Service has suggested that government employes use the new slogan in their everyday contacts as an expression of their determination to carry on the tremendous task of building an adequate national defense. Perhaps "Keep 'Em Flying" could equally well be used by telephone workers — indeed, all workers—in these critical days.

XUM

The Plant Man's Notebook

By RAY BLAIN
Technical Editor

MOST construction men have experienced considerable difficulty with ordinary guy strand flaring out and unraveling when cut. To prevent this, the strand must be served or bound on each side of the cut. Also, considerable time may be lost when



This photograph indicates how preformed strand is docile and may be handled without having the ends served. The wires in the strand hold their helical form so that they may be opened up and closed again without difficulty.

this binding is removed so that the strand end may be served or clamped to the main strand.

This difficulty may now be avoided by the purchase of preformed strand which will not ravel and flare out when cut even though no binder is used. Contrary to general belief, preformed strand only costs about 2½ per cent more than the regular or non-preformed variety.

One company has given us an actual example of a job where a total saving of $4.16 was realized when 1,000 feet of preformed strand was used for the installation of guys.

In addition to the money saving, considerable satisfaction was unquestionably enjoyed by the linemen who naturally react favorably to better workmanship.

We have a letter from R. D. Collins, of the Colbell Coiled Cords Co., who advises that retractable cords are ideal for use on the outdoor type telephones as described in my column in the May 3 issue. Mr. Collins is entirely correct for the regular cord does get pinched in the door of the telephone and frequently causes trouble. This could not happen with a coiled cord. Without a doubt, the retractable type of cord in some form will be used extensively on the telephone of the future.

* * *

While traveling cross-country by automobile recently, we stopped in at a small exchange to watch the linemen pull in a length of aerial cable. Grips of the woven wire variety were not available and the pulling-in line was simply lashed to the cable. This line pulled loose twice before a satisfactory hitch could be made and considerable time was lost while the rings were replaced.

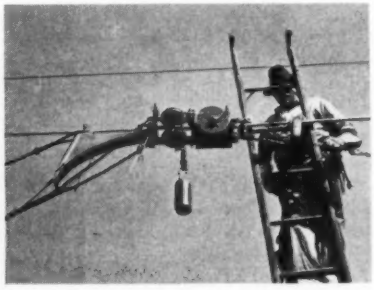
It is also possible that the cable was injured so that trouble will later develop. Woven wire grips cost very little and in our opinion no telephone company can well afford to be without a set of various sizes to fit the types of cable commonly used.

* * *

A manufacturer of a gasoline-operated hammer drill advises us that the starting difficulties previously experienced with this tool have been eliminated by the use of a small storage battery for ignition. It seems that dry cells, when used on this drill, will soon run down so that they do not have proper voltage to provide a good spark. The storage battery furnishes proper voltage until practically discharged—so no more "temperamental" gasoline hammer drills!

* * *

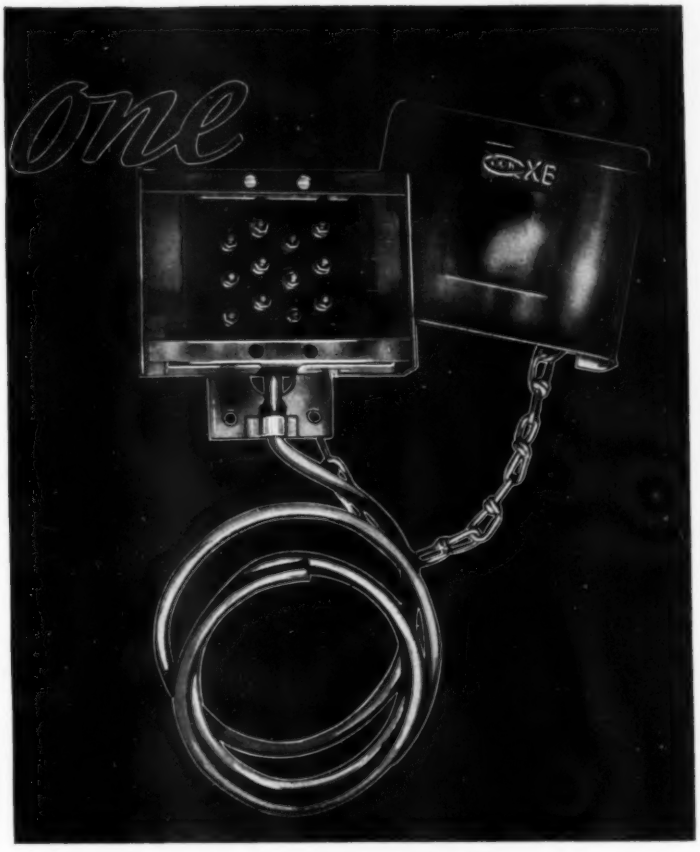
The telephone friends of Maj. Allen K. Hamilton, U. S. Signal Corps, will please note that his new address is Headquarters First Army Corps, 1429 Senate Street, Columbia, S. C.



These photographs—sent in by Wesley Cole, telephone engineer of U. S. Signal Corps, Seventh Corps Area, Omaha, Neb.—show a new type of cable spinner being used by the Southwestern Bell Telephone Co. at Little Rock, Ark. This machine is of the type pulled by a truck so that aerial cable may be installed in one operation. The cable feeder in front of the spinner is used to straighten the cable and line it up on the messenger before spinning in place. Note the heavy weight suspended below the machine to prevent it from turning sideways on messenger during the spinning operation.

XUM

THE *Only* one



THE Cook Six-Pair XB Unprotected Pole Cable Terminal is the ***only*** six-pair terminal designed, engineered, built and sold as a six-pair job. It is the only six-pair terminal that gives you ***all*** the quality features found in the larger Cook XB terminals.

. . . patented one piece Bakelite face plate and insulating fanning strip . . . sturdy, non-corroding Everdur studs with tinned solder shoulders firmly embedded in mounting plate so they cannot turn or loosen . . . raised stud mountings that eliminate surface leakage . . . studs correctly positioned for quick, convenient wiring . . . non-corrosive nuts and washers for quick, low-resistance connections.

The same patented cable entrance and holding sleeve for tight cable joint . . . the same exclusive process for compound filling insuring against shorts and grounds . . . the same heavy reversible zinc hood for mounting with stub from top or bottom . . . the same hot dip galvanized alloy steel frame . . . ***the same five star features all the way through the six-pair XB that are found in the larger sizes.***

The Cook Six-Pair XB has a variety of uses and will save in installation and maintenance costs many times its low purchase price. Buy the Six-Pair XB from any telephone manufacturer or supply house.

COOK ELECTRIC COMPANY 2700 SOUTHPORT AVENUE CHICAGO

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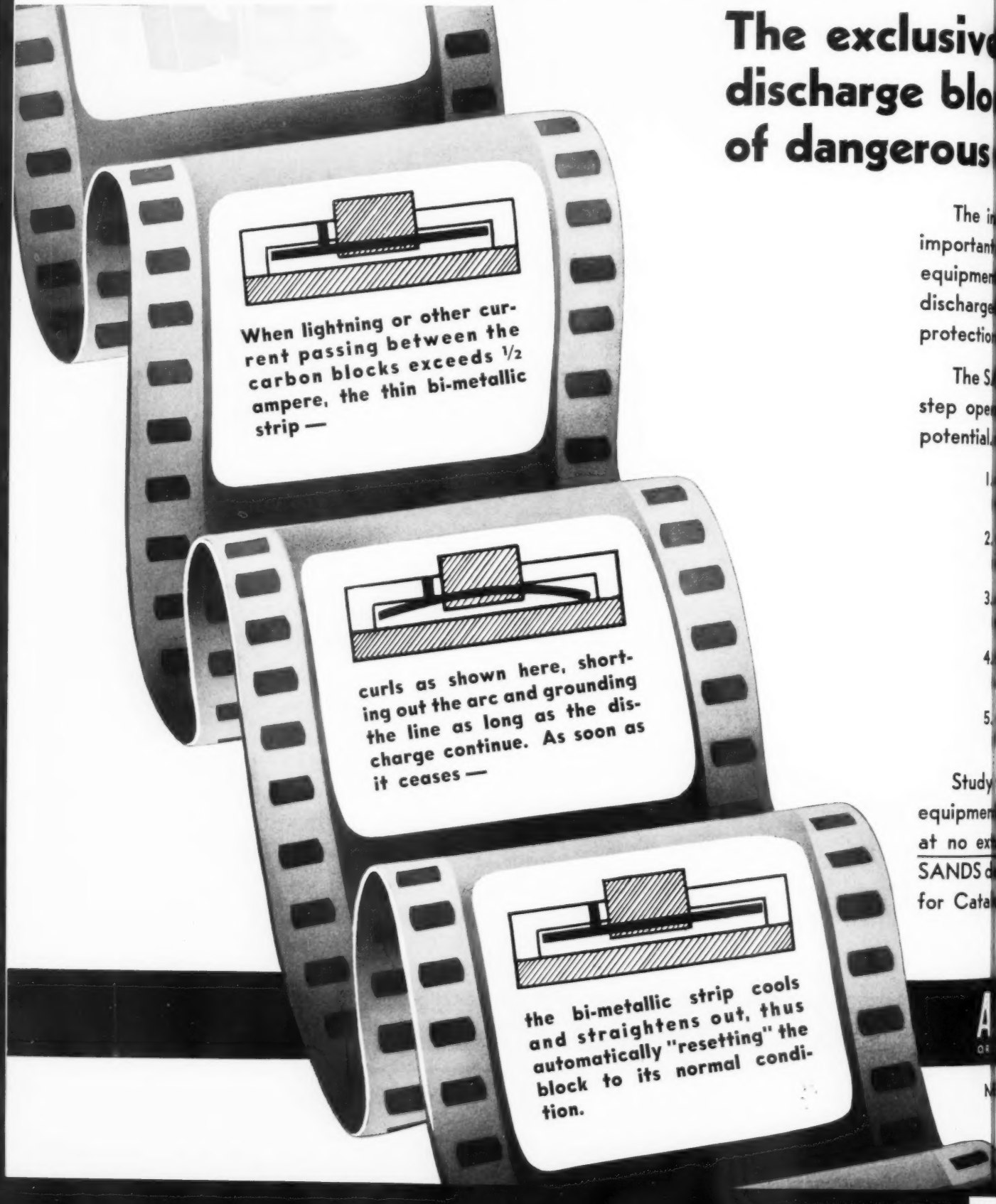
When lightning or other current passing between the carbon blocks exceeds 1/2 ampere, the thin bi-metallic strip —
curls as shown here, shorting out the arc and grounding the line as long as the discharge continue. As soon as it ceases —
the bi-metallic strip cools and straightens out, thus automatically "resetting" the block to its normal condition.

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"...OF SANDS' BETTER PROTECTION!

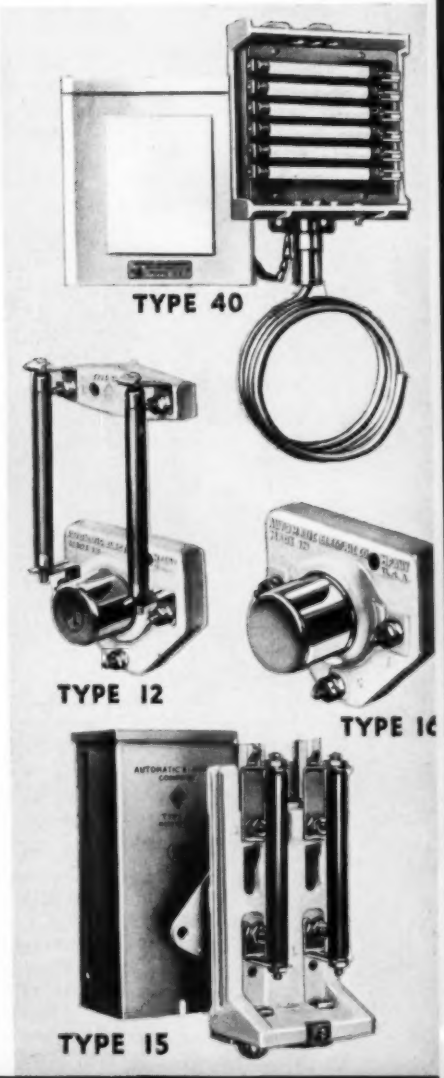
ive three-step operation of the Sands Type 2105 lo provides complete protection from all types us otentials . . .

The in ing program of rural power line construction makes it doubly ortant telephone companies to protect their substations and other pmen m power line crosses and stray currents, as well as lightning harge when you buy protective equipment, be sure you get complete ectio

The S Type 2105 discharge block, with its exclusive design and three- ope assures complete protection from every type of dangerous ential e's why:—

1. on to carbon discharge surfaces. (Metal ones sometimes away and enlarge gap beyond safe limits).
2. gap manufactured to microscopically close tolerances. (As- uniform reliability of operation).
3. nds line automatically on currents of ½ ampere or more. nts deterioration from continued arc.)
4. matically resets itself after current ceases. (Eliminates con- inspection, resetting and replacement expense.)
5. gap type—fully enclosed and self-cleaning. (Cannot fill up dust and moisture.)

Study iagrams shown here—then remember that all SANDS protective ipmen this Type 2105 discharge block as standard equipment, and no extra! That is why so many operating organizations are using NDS d exclusively—to get the complete protection they afford. Write Cata 068-A—sent promptly upon request!



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The Operator's Corner

By MAYME WORKMAN
Traffic Supervisor
The Illinois Telephone Association

DO YOU have a "Signal Snapper" in your office? An operator who tries to plug out every signal that appears on the switchboard? If you do, you can appreciate how exasperating this condition is both from a service and an operating standpoint.

It is true, speed is one of the three essentials to good telephone service, but it should not be developed to the point where the other two important requisites—courtesy and accuracy—are slighted.

"Should an operator plug out a signal before she is ready to take a call?" is our first query this week. Well, let's see what happens if, and when, this action is taken. A line signal appears and the operator answers, "Number, please?" and immediately plugs out another signal. She encounters delay on the first call, such as difficulty in hearing the calling party. Knowing she has another signal plugged out, her voice displays hurry or impatience as she requests the order a second time, "What number, please?" or, she may fail to use this prescribed phrase, saying, "I can't hear you," with a note of impatience in her voice.

The second signal is still plugged out although another operator is available and could take the second party's call if the signal still appeared on the switchboard. The operator having the signal plugged out is becoming irritated by this time as she requests the calling party's number a third time. She understands and acknowledges the order, establishes the connection and hurriedly requests the order from the calling party on the "plugged out" signal, heaving a sigh and, before the connection has been established, again proceeds to plug out a signal.

An operator should prepare to answer another signal as soon as she has answered a call but should not *plug out* a signal until she is ready to accept the order. By doing so she makes it impossible for any other operator to serve the calling party.

Operators who try to answer every signal that appears on the switchboard are usually careless in supervising established connections, in making subsequent rings and in rendering service to customers that is pleasing and unhurried. Enunciation is frequently poor and occasionally a wrong number is reached because the operator accepts a doubtful order.

Speed does not consist of mere haste but is the smooth and orderly performance of each act, with no lost motion and with the least expenditure of energy. Operators should be attentive, alert, answering line signals with the least possible delay. The operator who does not take her fair portion of calls and the signal snatcher are thorns in the sides of other operators. There is a happy medium which results in pleasing service to customers and promotes good will among the operating force.

Questions from Illinois Operators

1. Should an operator plug out a signal before she is ready to take a call?
2. Are we permitted to call a number at a distant office to secure information to help us to locate a called party if we do not expect to locate the called party at that number?
3. Should the rate be shown on the reverse side of a ticket on which you quote T. & C. to hotels?
4. When should a filing time be entered on a ticket?
5. When a person call is AG'd to another person at another address in the same city, is the call canceled and another ticket made out?

The answers to these traffic questions are presented on page 31.

▼ ▼

Urges Fire Prevention as Defense Help

Emphasizing the dependence of national defense on the telephone as a means of communication, the Nebraska Telephone Association, in a bulletin released by Secretary George M. Kloidy, urges all telephone companies, large and small, to eliminate fire hazards which might result in interruptions to service.

"At this time when the telephone industry has such an important part in the national defense program, and has been requested to keep its facilities in readiness for use at all times, every telephone company, large or small, should bend its effort in the direction of eliminating existing conditions which, if not corrected, may cause the interruption of service. This means, in part, the going over of all lines, urban and rural, eliminating tree and other hazards and making needed repairs and replacements. Switched line companies should be urged to do the same.

"A careful inspection of central offices should be made and fire hazards eliminated. Floors under stoves should be protected by metal and the walls, ceilings, partitions and woodwork should be properly protected from overheating of stoves, furnaces and smokepipes. Rubbish or trash should not be allowed to collect or pile up around the premises, especially in the basement or in the attic.

"Metal containers should be pro-

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vided for ashes. If ashes are emptied outdoors they should not be dumped near outbuildings or fences. If rubbish and trash must be burned to get rid of it, a trash burner made of metal or other material that will withstand fire should be used. Oily rags or waste used for cleaning should be burned after using or, if kept, placed in a metal can with tight cover. So-called "dustless" mops should not be put in any close place, such as closets, broom-closets, etc. Lack of air and ventilation may easily cause such oily rags or mops to catch fire by spontaneous combustion (self-ignition).

"Every central office should be provided with one or more fire extinguishers. A satisfactory extinguisher is one which uses carbon tetrachloride, a mixture which is valuable in fires involving electrical apparatus, where water would cause dangerous short circuits. Both the Fyr Fyter and Pyrene extinguishers use this mixture.

"The telephone is probably depended upon for more than 90 per cent of fire signaling service in Nebraska, and the state fire marshal has asked our support towards eliminating, as much as possible, existing fire hazards and other faulty conditions which, if not corrected, may cause disruption of the service. We have promised him our support and are convinced that the telephone industry in Nebraska will give this matter its full cooperation."

▼ ▼

Gulf States Company Elects Officers

At the annual meeting of the Gulf States Telephone Co., held at Tyler, Texas, May 13, the following officers were elected:

S. A. Lindsey, president; Oscar Burton, vice president and general manager; John F. Merrick, vice president; C. W. Jacobs, secretary and auditor; G. N. Ogletree, assistant secretary and treasurer, and Lynne Anderson, assistant treasurer.

The Gulf States company gained 225 company-owned telephones during 1940, Vice President Burton reports. To January 1, 1941, the company had regained 1,708 stations, or 86 per cent of the losses sustained from the high point in 1930 to the low point of the depression in July, 1933.

Although the company had a gain of $11,000 gross revenue during the year, expenses increased by $17,000. A large part of the increase, Mr. Burton points out, was due to the increase in taxes, which now amount to 15 cents out of each dollar of income. In 1928, the company's annual direct tax bill amounted to $3.14 per telephone in service; in 1940 the figure was $8.06.

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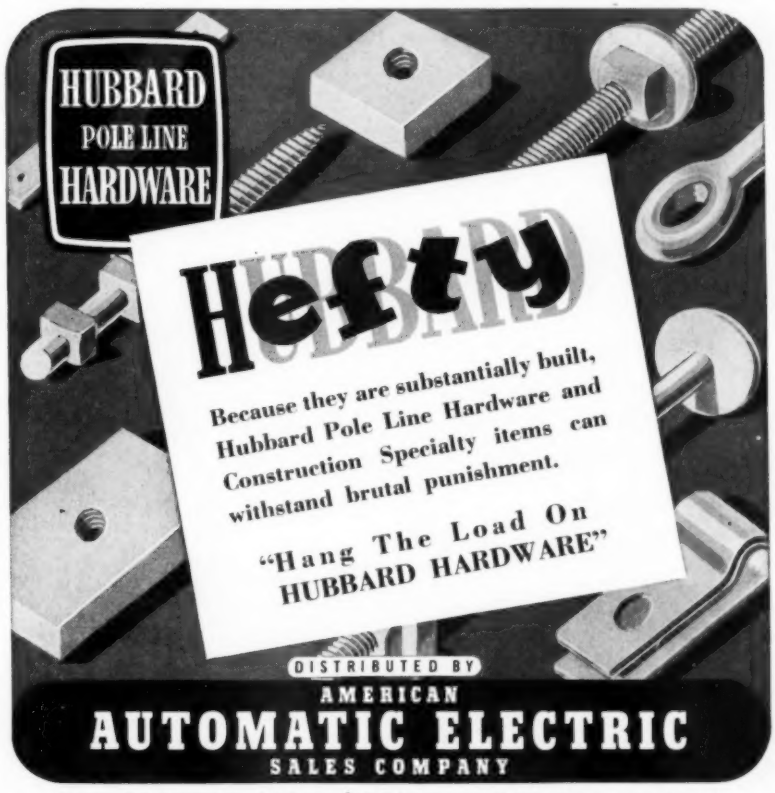

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HE AND THE TELEPHONE ARE IMPORTANT TO EACH OTHER

AN ADVERTISEMENT

OF THE

BELL TELEPHONE SYSTEM

Telephone service is important to busy young Americans. And these young Americans are important to the telephone companies of the country. Advertisements like the one on the opposite page are helping to build an appreciation of telephone service among the men and women of tomorrow. This advertisement is appearing during May and June—one of a regular series in juvenile magazines. Advertising like this should help to make young friends for the whole telephone industry.

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The "Good-bye" that said "Hello" to the World

Twenty-six years ago, a young Bell System engineer sat waiting at the Eiffel Tower, in Paris, hoping to hear the first spoken words transmitted across the Atlantic.

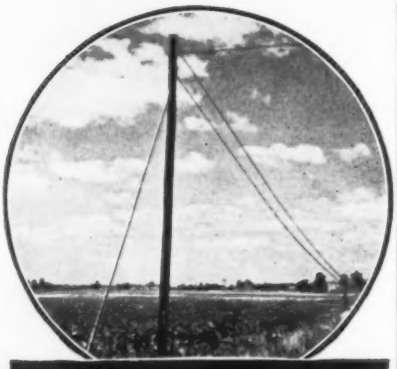
Hour after hour he listened. He knew that a fellow engineer at Arlington, Virginia, was trying to reach him. Once, he heard counting: *one, two, three . . . one, two, three.* It was very faint, but it gave him hope.

For days, he stood watch, straining to catch a phrase, a word, a syllable. On October 21, 1915, he heard clearly and unmistakably: *"Good-bye, Shreeve."* The human voice had leaped the Atlantic!

At the same time, the message was picked up by another Bell System sentinel in Honolulu — on the other side of the world!

That is the story of the first successful use of the radio telephone in overseas communication. Today, thanks to Bell System development, America's telephones can be connected, except in time of war, to almost any other telephone in the world.

BELL TELEPHONE SYSTEM



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HIGH-TENSILE
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LINE WIRE

MEET RURAL DEMANDS WITH LONGER SPANS!

You now can extend rural telephone service more economically, more profitably, by building long-span lines with Crapo HTL-85 and Crapo HTL-135 High-strength Line Wire.

Marked reductions in construction costs, lower maintenance expense, improved transmission, are reported wherever these high-tensile, low-resistance line wires are in use.

Crapo HTL-85 permits spans of 225 feet in heavy loading, 325 feet in medium loading and 375 feet in light loading districts; provides stronger spans on existing lines.

Crapo HTL-135 makes practicable spans of 350 feet in heavy loading, 450 feet in medium loading and 500 feet in light loading areas.

Before you construct new rural lines or rebuild old ones, be sure to get all the facts about these revolutionary wires! Complete technical and construction practice information, available in booklet form. Write for Bulletins No. 201 and No. 202!

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Manufacturers of
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Personals

H. P. KARNES, of the Commonwealth Telephone Co., Madison, Wis., is the new commercial superintendent of the Indiana Associated Telephone Co., with headquarters in Lafayette. He succeeds **B. W. SAUNDERS,** who is now general manager of the Lexington (Ky.) Telephone Co. **GEORGE HENTERSEHER** is now traffic superintendent of the Indiana company.

•

K. B. CARY, district manager at Lincoln, Neb., for the Lincoln Telephone & Telegraph Co., has been chosen to lead the annual drive in that city for the Salvation Army's maintenance fund. In accepting the appointment Mr. Cary stressed the great need now existing to prevent moral disintegration as a result of war and unrest, and said he was glad to do all that is possible to help keep this army's flag of human service flying in the community.

•

JOHN H. AGEE, general manager of the Lincoln (Neb.) Telephone & Telegraph Co., was one of five graduates of the University of Nebraska honored recently by the university alumni association with the presentation of distinguished service awards. In addition to his work as president and director of the United States Independent Telephone Association and as a national counselor of the United States Chamber of Commerce, he served as president of the alumni association.

He is now president of the university foundation, which is authorized by law to accept legacies and other contributions for the financing of scholarships. Mr. Agee was graduated from the University of Nebraska in 1910.

•

More than 600 New Jersey business, professional and civic leaders recently joined in paying tribute to **CHESTER I. BARNARD,** president of the New Jersey Bell Telephone Co., at a luncheon during which he received the Advertising Club of Newark's award as "Newark's Outstanding Citizen of 1940."

The award, a bronze plaque, was presented by H. I. Segal, chairman of the club's award committee, and was given to Mr. Barnard, he said, as public recognition of his exemplification of "man's consideration for man." Franklin Conklin, Jr., president of Flood & Conklin Co., Newark, paid high tribute to Mr. Barnard's accomplishments and his contributions to the community.

In his response, Mr. Barnard expressed the opinion that effective citizenship under present-day conditions calls for individual initiative, independence and acceptance of responsibility, combined with a willingness to cooperate effectively with other individuals and organizations. He stressed the need of cooperation in community as well as in national activities.

•

LLOYD W. CLEVELAND, area commercial manager of the Lincoln (Neb.) Telephone & Telegraph Co. at York, Neb., has been named chief clerk of the western district of the company, with headquarters at Hastings. Mr. Cleveland joined the Lincoln business office as a salesman in May, 1934. In 1938 he was made a commercial representative and in the following year was transferred to York.

•

MR. AND MRS. JAMES CAMPBELL recently replaced **MR. AND MRS. RUE DAVIS** as office managers of the Farmers Telephone Co. at Batavia, Iowa, following the resignation of Mr. and Mrs. Davis. Mr. Campbell will also serve as lineman for the company, replacing **ROY BLACK. MRS. D. W. JOHNSON** will continue as assistant operator.

•

W. S. ARGABRIGHT, formerly manager of the Elizabethton (Tenn.) exchange of the Inter-Mountain Telephone Co., has succeeded **AUBREY WOOLFORD** as manager of the Kingsport exchange of the Inter-Mountain company. Mr. Woolford has been called to army duty.

•

J. P. BORDEN, Charlottesville (Va.) group manager of the Central Electric & Telephone Co., presided at a recent session of the Charlottesville-Albemarle Safety Council, at which activities of the past year were outlined. Mr. Borden is retiring chairman of the group, which during 1940 promoted

such safety measures as license tags for bicycles; assistance to a neighboring town in organizing a safety council, and distribution of more than 10,000 safety posters and bulletins.

•

"Shooting trouble" is no longer a symbolic term for **J. M. NELSON,** manager of the Lakota, N. D. exchange of the Northwestern Bell Telephone Co. He was recently called to a point where a break in a reservoir had not only broken off a pole but left it hanging by its wires in water so deep and swift that it could not be reached by wading or by a boat. Mr. Nelson used 28 bullets in shooting the insulators off the crossarms, releasing the pole, but leaving him with a great mass of wires to untangle.

•

G. G. PERRY, manager of the Compania Telefonica del Pacifico, Cali, Colombia, was the victor in the finals of a recent golf tourney. He defeated his opponent, Major F. Glatzberg, in a 36-hole match, winning the "Pielroja" cup.

Mr. Perry is the son of G. O. Perry, vice president and general manager of the Citizen's Independent Telephone Co., Terre Haute, Ind.

•

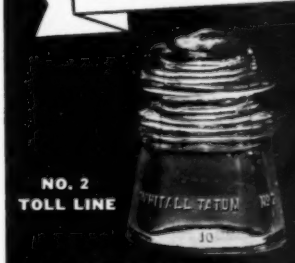
JACK NAYLOR, telephone and telegraph engineer for the Public Utilities Commissioner of Oregon, left the service of the commissioner on May 31, Mr. Naylor is taking a position with the Associated Telephone Co., Ltd., in Santa Monica, Calif. A graduate of the Oregon State College at Corvallis, he made a fine reputation during his period of service at Salem.

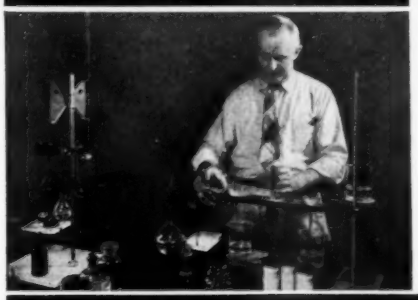
•

MRS. H. C. KLOETY, chief operator at the Whitehall (Wis.) exchange of the Community Telephone Co., has resigned after 28 years at the switchboard. As Mathilda Hogue she began her "hello" career in her home town of Strum, working there one year before going to Whitehall. She began as operator for the Lincoln Telephone Co., a farmer's cooperative concern, and later served as secretary and chief operator, succeeding C. F. Huleatt of Chandler, Ariz., in 1920. She continued with the cooperative until it was absorbed by the Community Telephone Co. several years ago.

Her work has been continuous except for four years when she clerked in Huleatt's hardware store, which was on the first floor of the building where the telephone office was located. During this time she served as relief operator.

CRYSTAL CLARITY OF "WT" GLASS GUARDS AGAINST MALICIOUS BREAKAGE



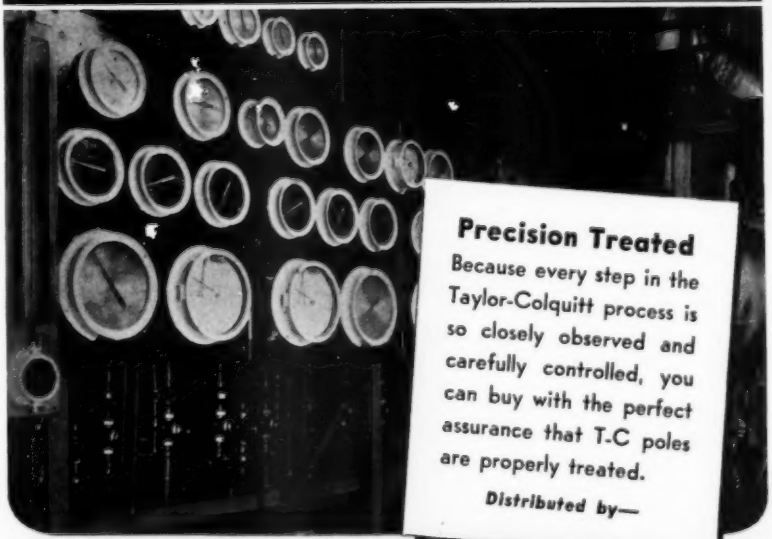


MALICIOUS breakage is minimized when you use Armstrong's Whitall Tatum Glass Insulators. Here is the reason: Manufactured of crystal-clear glass, they do not stand out against the sky—and hence are difficult targets.

The lower illustration shows batch materials undergoing rigid chemical inspection in Armstrong's research laboratory. Tested in accordance with A. S. T. M. methods, all "WT" Insulators manifest the highest standards of manufacture. For complete information, samples, and prices, see your jobber or distributor—or write Armstrong Cork Co., Glass Insulators Dept., 295 Fifth Avenue, New York City.

WHITALL TATUM GLASS INSULATORS
MADE BY ARMSTRONG

TAYLOR-COLQUITT CO.
CREOSOTED PINE POLES



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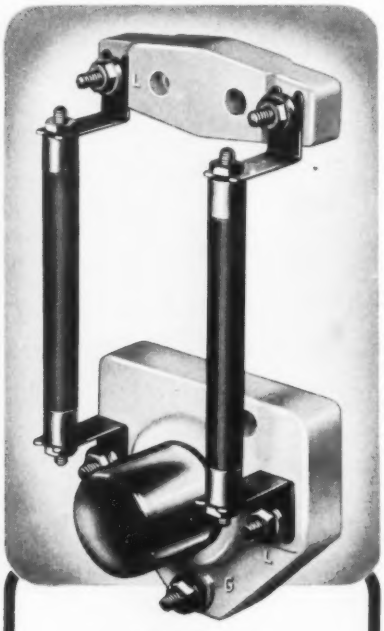

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You can get **full** protection with **lower** maintenance costs by installing the SANDS Type 12 Indoor Protector. Its 2105 Discharge Block is self grounding on heavy currents, and automatically resets itself when the current ceases. Eliminates re-setting expense, and —best of all—you're assured of constant, unfailing protection. Put Type 12 at the top of your next supply order.

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Lorain Ship-to-Shore Radio Telephone Service Grows

THE PRESENT navigation season, which is now well under way and which because of national emergency is expected to be the greatest in the history of the Great Lakes, also is destined to be its safest. The safest factor is radio telephones, and more of them are in service on lake vessels this year than ever before.

An unpretentious one-story brick building near the lake shore just west of Lorain, Ohio, will be the voice and ears of the "inland seas."

With two other shore stations at Pt. Washington, Wis., and Duluth, Minn.—300 miles apart — the Lorain station gives lake freighters and passenger craft telephone service.

In addition to providing the most economical vessel dispatching system in the world, it is estimated the telephone-equipped vessels have saved more than 100 lives on the lake through prompt action during the last seven years.

Besides placing medical service on call, lake telephones provide twice-a-day weather reports, particularly valuable early and late in the season when storms blow up with little warning.

The Lorain County Radio Corp., pioneer in ship-to-shore radio telephone service, today supplies its own equipment and direct service to 248 American vessels on the Great Lakes. In addition, about 100 other American and Canadian vessels which use equipment of other companies depend on this Lorain pioneer for part of its telephone service.

The first ore carrier on the lakes to install ship-to-shore telephone service also provided the first instance of medical service on the lakes by radio telephone.

Capt. E. R. Morton of the William C. Atwater—now the E. J. Kulas of the Wilson Transit Co. fleet—suffered severe bleeding as the result of an accident while aboard ship on Lake Superior on Aug. 27, 1934, in the first year of radio telephone service on the lakes.

First aid treatment on the ship failed to stop the bleeding. Other officers notified the Lorain station. The Lorain operator telephoned Dr. A. T. Grills and the necessary instructions were given. This probably saved the captain's life. He was transferred to a hospital at Marquette.

The Lorain company, headed by Herman E. Hageman, who also is president of the Lorain Telephone Co., developed ship-to-shore telephones to keep from reducing employment or undergoing financial distress when the telephone company started losing subscribers at the start of the depression. The company now has an investment of nearly $1,000,000 in equipment.

BOUQUETS FROM READERS

In these busy days when readers of TELEPHONY can find time to write us letters we are appreciative. There obviously would not be space to publish all such letters. However, we think it fitting and proper, now and then, to publicly acknowledge readers' letters, and at this time we say "Thank You" to:

C. E. EABY, vice president and general manager, Denver & Ephrata Telephone & Telegraph Co., Ephrata, Pa., who recently sent in some news material to TELEPHONY for publication in "*our* telephone magazine." "TELEPHONY is part of our company and we couldn't do without it," says Mr. Eaby. "We were very sorry to hear of Mr. Edwards' death, but we congratulate you on your new set-up."

* * *

L. M. LAMKINS, manager of the Manawa Telephone Co., Manawa, Wis., says: "Kindest personal wishes for the success of TELEPHONY. I have read every issue for 21 years."

FRIENDLY METALS

MAKE DEPENDABLE CONNECTIONS

COPPERWELD

Non-Fusing

GROUND RODS and CLAMPS

COPPER-TO-COPPER CONTACT HERE

Copper and iron, copper and zinc or other dissimilar metals in contact create galvanic couples particularly active in the presence of soil electrolyte. The copper-to-copper contact of a copper grounding wire clamped to a Copperweld ground rod with a Copperweld clamp assures friendly metals in contact under the ground.

COPPERWELD PIGTAIL CONNECTIONS

Where pigtail connections are desired, Copperweld telephone ground rods are furnished with 18" or 36" .104 annealed copper wire clipped and soldered firmly to the rod.

COPPERWELD STEEL COMPANY · GLASSPORT, PA.

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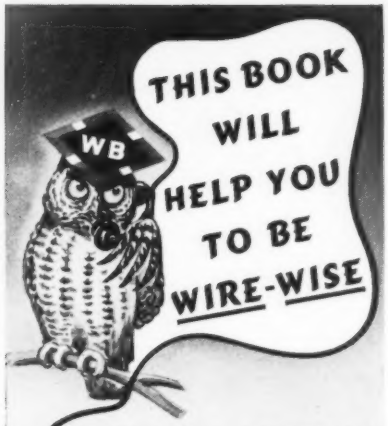

NEW W-B BULLETIN TELLS HOW TO JUDGE DROP WIRE QUALITY

A new W-B booklet summarizes the points to look for layer by layer, from the inside out. It also gives an interesting picture story.

W-B control tests applied to materials, processing methods and finished wire, along with latest specifications on drop wire, bridle wire, inside wires and flameproof distribution frame wire are featured in this book.

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Commissions and Courts

Workers Must Join Union Selected by Majority

The United States Supreme Court has ruled that workers in a single unit of a company cannot choose their own bargaining agency, but must join the group selected by the majority of the employes of the company. This ruling applies to companies which have several operating units located throughout the country, where those units have employes who may be identified in a union representing a certain trade.

Association Intervenes in Franchise Case

The Illinois Telephone Association, through its general counsel, Ben B. Boynton, has filed a brief in connection with an appeal by two electric companies and the Illinois Commerce Commission from a recent decision of the state supreme court giving cities and villages the right to enforce the ouster of public utilities on expiration of their franchises.

On April 10, Justice Farthing of the supreme court overruled its previous decision that cities and villages do not have the right to order the removal of utilities' property upon expiration of their franchises (TELEPHONY, May 10, page 23). Since telephone companies in the state would be seriously injured if they could no longer rely on the old ruling, Mr. Boynton entered a motion, which was granted, to file a brief as a friend of the court. Ten other attorneys representing telephone companies joined with Mr. Boynton in his motion and brief.

Invaded Exchange Area, Company Charges

Invasion of the Guthrie (Okla.) exchange area of the Southwestern Bell Telephone Co. by E. D. Simpkins was alleged by Bell attorneys in a hearing June 2, at which Mr. Simpkins asked the Oklahoma Corporation Commission for authority to build a toll line from Rusty, a little oil town nine miles northeast of Guthrie, into the Guthrie exchange.

The Southwestern Bell company asserted that it has been furnishing for many years exchange and toll service through its Guthrie exchange, to farmers on two cooperative rural lines leading from the Rusty vicinity into Guthrie. Mr. Simpkins recently built a local exchange at Rusty and a long distance line from there to Guthrie, but has not connected this line at either end awaiting the outcome of his present application.

The Southwestern Bell company also has two individual lines into the Rusty neighborhood, connected to oil properties. Mr. Simpkins claimed that those not connected to cooperative lines in the district are without toll or local exchange service; therefore, he contended, the Rusty vicinity is open territory and not adequately served by the Bell company. The Bell denies this, stating that it has adequately served the territory since 1905 and is ready to give service to any other persons who may apply through regular channels.

The corporation commission took the case under advisement.

Rate Cuts in New England Announced

The New England Telephone & Telegraph Co. has announced rate reductions in Massachusetts, New Hampshire and Rhode Island, effective July 10, which will result in estimated annual savings to subscribers of nearly a million dollars in these three states. Discussions also are under way with the authorities in Maine and Vermont as to rate adjustments.

The Massachusetts rate reductions are estimated at $105,000 per year through reduction of person-to-person overtime rates and the elimination of report charges on both two-point and conference services within the state.

There will also accrue to Massachusetts customers of the company, on messages sent to interstate points over its own lines, savings of $635,000 per year due to changes in the basic toll and overtime rates for person-to-person messages and the elimination of report charges on uncompleted person-to-person calls and reverse charge calls.

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In New Hampshire the estimated annual savings due to reduced toll charges will be $70,000. Rhode Island will save about $115,000 a year. In general, overtime rates on person-to-person calls will be reduced to the level of overtime charges on station-to-station calls.

▼ ▼

Company Must Pay for Cable Relocating

The Pennsylvania Supreme Court, in a recent decision, has held that a telephone company is not entitled to compensation for the expense of relocating its underground plant when such relocation is made necessary by the construction of a subway or underpass.

The case arose when the Bell Telephone Co. of Pennsylvania was required to move some manholes and cables in connection with the construction of a subway and underpass by the Delaware River Joint Commission.

In its decision the court declared that the ordinance under which the company occupied the streets conferred no franchise, interest or estate in any particular portion of the street. Therefore, to require the company to move conduits from one location in the street to another is not a taking of property, and Pennsylvania statutes make no provision for compensation for consequential damages.

Answers to Traffic Questions on Page 22

1. No. For additional information, please refer to preface.
2. Yes, to a point within a reasonable distance.
3. Yes. The rate should be entered on the back of the ticket at the bottom on all calls on which it is necessary to quote the charge.
4. If the operator for any reason does not immediately proceed with the attempt to complete the call, the filing time should be entered. This entry should also be made on all WH report tickets.
5. Yes. The first call is canceled and a new ticket is made. The attempt to complete the call to a different party at a different station is considered a new call.

▼ ▼

Authorize Stock Issue for C. & P. of Va.

The Virginia State Corporation Commission on May 10 authorized the Chesapeake & Potomac Telephone Co. of Virginia to issue $6,000,000, par value, of its common capital stock to the American Telephone & Telegraph Co. for the retirement of an equal amount of indebtedness of the C. & P. to its parent company.

The stock issue is to be in portions of $100 a share, par value, and the commission ordered reports to be made on the proceedings at a hearing to be set not later than July 15.

▼ ▼

Injunction Halts Woman's "Telephone Barrage"

A permanent injunction restraining Mrs. Mary Crutcher, owner of an apartment house in St. Louis, Mo., from continuing her barrage of tele-

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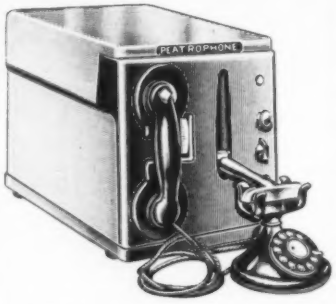

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phone calls to the nearby Taystee Bread Co., in protest against operation of a ventilating fan at the bakery, was issued June 3 by Circuit Judge David J. Murphy. He denied her application for a temporary injunction against operation of the fan.

Judge Murphy held that more than 400 telephone calls from last June to last March, both to offices of the company and to homes of executives, were malicious. They caused "great inconvenience, discomfort and annoyance" to the executives and impaired their efficiency, the court found.

Mrs. Crutcher had complained (TELEPHONY, May 17, page 32) that the fan "sounded like an airplane, a steam locomotive and a hailstorm combined," and disturbed her rest and that of her tenants.

▼ ▼

Injunction Halts Work On Telephone Line

A temporary injunction granted by Circuit Judge May Walker, Tallahassee, Fla., has halted construction of a telephone line from Port St. Joe to Tallahassee by the St. Joseph Telephone & Telegraph Co.

The injunction was obtained by the Southeastern Telephone Co., and enjoins the Port St. Joe company from building lines in Leon and Wakulla counties.

▼ ▼

Summary of Commission Hearings and Rulings

Federal Communications Commission

May 29: Granted authority to Bell Telephone Co. of Pennsylvania and Chesapeake & Potomac Telephone Co. of West Virginia to supplement existing facilities between Burgettstown, Pa., and Steubenville, Ohio.

May 29: Application received from Southern Bell Telephone & Telegraph Co., asking authority to supplement existing facilities by constructing between Copperhill, Tenn., and Blue Ridge, Ga., three pairs of .104 copper wires for a distance of 11.54 miles, two pairs of .104 copper wires for a distance of 1.66 miles, and the placing of 338 10-pin crossarms.

May 29: Pacific Telephone & Telegraph Co. requested authority to supplement existing facilities between Hood River, Ore., and the Oregon-Idaho state line via Pendleton and Baker, Ore.

June 3: Approved a letter to be forwarded to the president of the Northwestern Bell Telephone Co., interposing no objection to the filing of a modified schedule of interstate toll rates, but advising that the commission proposes to conduct investigations of those rates which will remain higher than those of the long lines department, and may initiate proceedings at any time it deems appropriate. The company estimates the proposed rate reductions will amount to $178,000 annually.

June 3: Announced a net reduction of about $250,000 in telephone rates in the New England area, to become effective July 1 as the result of new tariffs filed by the New England Telephone & Telegraph Co.

June 3: Granted authority to George A. Morley to hold positions as director of the Connecticut Valley Telephone Co., Inc., Western New England Telephone Co. and White River Valley Telephone Co.

June 3: William A. Wilkins granted authority to hold positions as secretary of Westerly (R. I.) Automatic Telephone Co. and clerk of Western New England Telephone Co.

June 4: Application received from Carolina Telephone & Telegraph Co. requesting authority to supplement existing facilities between the Virginia-North Carolina state line and New Bern, N. C.

June 4: American Telephone & Telegraph Co. requested authority to supplement existing facilities between Gastonia, N. C., and Bristol, Tenn.

June 5: Ordered cancelled the hearing, scheduled for June 9, on the investigation of the rates, charges, practices, etc., of the long lines department of the American Telephone & Telegraph Co. The commission on June 4 announced reductions in long lines rates and in certain schedules of Bell System associated companies.

California Railroad Commission

June 11: Hilda V. Marx authorized to sell to Melvin W. Hawes telephone property known as Bear Creek & Millville Telephone Lines.

June 11: Interstate Telegraph Co. authorized to establish telephone exchange and provide service at Pine Creek Canyon, Inyo county, and authorized to file and make effective rates for exchange and toll service in the area.

June 11: Los Gatos Telephone Co. asked authority to file rates for key system and colored handsets.

Illinois Commerce Commission

June 16: Hearing at Springfield in the matter of proposed advance in rates for telephone service in Carrollton by the Illinois Telephone Co.

Kansas State Corporation Commission

June 6: Hearing held on application of Southwestern Bell Telephone Co. for permission to put into effect new schedules of rates for the Emporia, Coffeyville-Dearing, Parsons, Independence, Manhattan, Leavenworth, Pittsburg and Lawrence exchanges.

June 6: Granted authority to East Kansas Telephone Co. to file revised collection rule for telephone service at Winchester.

Kentucky Public Service Commission

May 29: Following a stormy hearing in which citizens of Rockcastle county contended that adequate service was not being given, commission announced it would investigate the Mount Vernon Telephone Co., of which J. F. Dees is sole proprietor.

Massachusetts Department of Public Utilities

June 11: Baxter Milne, attorney for the New England Telephone & Tele-

COMING CONVENTIONS

Michigan Independent Telephone Association, Hotel Olds, Lansing, July 23 and 24. Golf day, July 22.

Association of American Railroads, Telephone Section, Hotel Gibson, Cincinnati, Ohio, September 23, 24 and 25.

South Dakota Telephone Association, Hotel Carpenter, Sioux Falls, October 8 and 9.

United States Independent Telephone Association, Hotel Stevens, Chicago, October 14, 15, 16 and 17.

Independent Pioneer Telephone Association, Hotel Stevens, Chicago, October 16.

graph Co., appeared in opposition to a petition seeking to have the town of Burlington added to the Boston metropolitan telephone area. Company contended that granting the petition would open the way for others which might add 60,000 telephones to the present 400,000 in the area and involve substantial increases in construction costs to provide the necessary cross-connections.

Petitioners are desirous of eliminating the present toll charge in effect between Boston and Burlington.

Missouri Public Service Commission

June 6: Joint application filed by Missouri Union Telephone Co. and Southwestern Bell Telephone Co. respecting proposed changes in exchange telephone service at Weldon Springs.

June 9: Applications filed by United Telephone Co., asking authority to file new rate schedules at Cole Camp and Appleton City.

Nebraska State Railway Commission

June 12: Application filed by Hooper Telephone Co. for authority to charge, in addition to base rate for single-line rural service, 40 cents a month for each quarter mile of necessary pole line construction.

June 12: Authority granted Norris public power district to construct 189 miles of rural transmission lines on the condition that it shall not begin work on any of the lines paralleling existing grounded lines of any of six protesting rural telephone companies unless and until an agreement relative to inductive interference has been signed with the telephone company involved and a copy of the agreement filed with the commission.

June 13: Application filed by Northwestern Bell Telephone Co. for authority to temporarily suspend service connection charges at Big Springs while exchange is undergoing transformation to dial service.

New York Public Service Commission

June 17: Hearing at Albany on petition of Highland Telephone Co. to issue bonds and stocks.

June 19: Hearing at New York in the proceeding by the commission as to certain rates, etc., of the New York Telephone Co. in respect to service through private branch exchanges in hotels, apartment houses and clubs.

June 20: Hearings at New York in the proceedings by the commission as to certain changes in tariffs of the New York Telephone Co., and as to rates, etc., of the New York company in respect to cable-carrying charges.

Ohio Public Utilities Commission

June 9: Ohio Bell Telephone Co. made application for permission to establish new lower rates on calls between downtown Cleveland and those outlying suburban exchanges to which toll charges apply and on toll charge calls between those suburban exchanges not in the Cleveland local service area.

June 12: Authorized Northern Ohio Telephone Co. to file, effective July 1, the following optional schedule for full automatic service in its Genoa exchange: Business independent line, $4.00; business five-party, $3.25; residence independent, $3.00; residence five-party, $2.50.

June 12: Granted application of American Telephone & Telegraph Co. for authority to subscribe for and purchase its pro rata portion, approximately 30 per cent, of 149,024 shares of $50 par value common stock issued by Cincinnati & Suburban Bell Telephone Co. under order of Oct. 21, 1940.

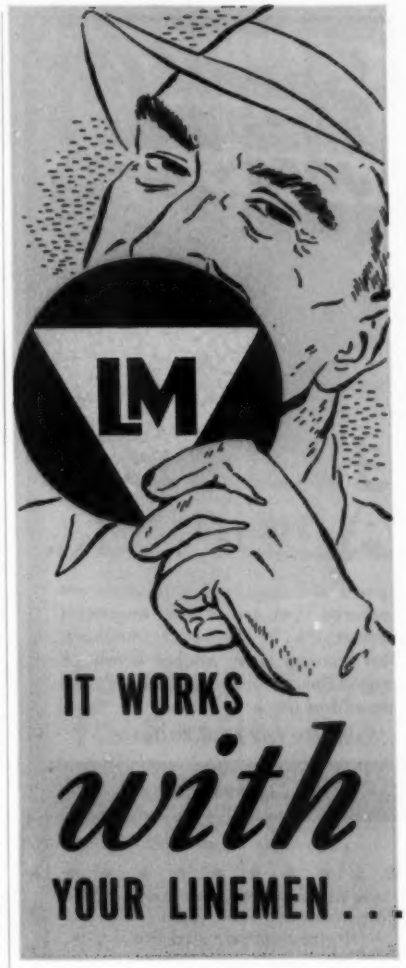
June 13: Approved and filed an agreement between the Ohio Bell Telephone Co. and G. A. Burcher, operating as the Somerton Telephone Co., whereby in consideration of the payment by Mr. Burcher to the Bell company of $2.50 per month, the subscribers at Somerton will have free service to the Barnesville exchange of the Bell and reverse. The Bell company was authorized to amend its Barnesville exchange tariff to conform to the arrangement.

June 13: Upon application, commission approved revised boundaries for the Upper Sandusky exchange of the Ohio Bell Telephone Co. and the Sycamore exchange of the Sycamore Telephone Co., covering transfer by each to the other of certain territory.

June 18: Ohio Bell Telephone Co. made application to revise its schedule of tariffs to reduce intrastate toll rates in conformity with reductions made by the American Telephone & Telegraph Co. in its interstate long distance rates. Company asks such authority be made effective July 10.

Oklahoma Corporation Commission

June 11: Hearing held on application of Joe Scott, owner of the Canute Telephone Co., for authority to charge $2.00 for installation of telephones where instrumentalities are not already in place. Case taken under advisement.



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(Continued from page 13)

The third guess is that a drastic reorganization of the FCC—to an extent that might affect the telephone industry—is not in the cards right now or in the discernible future. True, there are "ripper" bills in the offing—and there are people on Capitol Hill who would like to vote for them. But that would be too much like rocking the boat during the storm. The administration would not stand for it. The administration probably has enough control of the situation to prevent it.

So don't look for a new Federal Communications Commission to come out of this mess. And don't look for any complete rewriting of the Communications Act of 1934. But remember, this is all guesswork based on the situation as it looks today.

* * *

The reason why your correspondent believes that the radio broadcasters will swing enough support to compel some change in the FCC radio regulatory set-up is simply this: The theory behind the FCC majority order is, basically, a form of liberalism which is becoming somewhat obsolete even within the New Deal. To put it another way, the FCC ruling against radio network organizations obviously stems from the old Brandeis-Frankfurter theory of opposition to all large combinations. It might be called an "anti-utility complex," or "making little ones out of big ones."

Now whatever merit the "little business" school of economic thought may have in some lines of operation, there is grave doubt that it is suitable for an industry such as radio broadcasting. The FCC majority wants to protect the independent little business men from imposition by the big, evil broadcasting chains. But in the process, the American public (which has a superior right to the commission's protection) is likely to get short-changed through inferior program service.

It is as simple as that. If all the small radio stations are to operate on a dicker-and-barter basis, under which the networks would be degraded to mere talent-casting organizations in a highly competitive business, will the American public get a better radio show than under the present set-up? If so, the FCC majority is on sound ground.

But the burden of proof is on the party seeking to make such a drastic change. And it is a formidable burden of proof. All agree that the American broadcasting industry has done, and is doing, a swell job. It is not perfect. There are lots of faults. But it has yet to be demonstrated that these faults will be corrected by the mere process of smashing the central network organizations into little pieces.

The majority of the FCC predicts that "somebody" will keep the bands playing and the comedians cracking jokes. "Somebody" will be glad to pay for the news service, and even take care of such necessarily subsidized luxuries as high-price symphony and other cultural items. But the FCC is not very clear who is going to do it. Until that important point is made much clearer, this

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correspondent looks for Congress to hold back the reins on any precipitate action to throw the prevailing radio industry overboard.

* * *

Radio, electric, and telephone industries all seem to be putting the heat on the Office of Production Management to loosen up on the low priority rating given these respective industries in the B7 aluminum classification. As previously stated in this department, these industries are not so much worried about aluminum which is virtually unavailable anyhow for civilian purposes, regardless of classification. They are afraid that the B7 aluminum classification may be setting the pattern for OPM's priority ratings on other strategic metals, notably copper, nickel, zinc, and steel.

Just by way of evidence that the officials of the United States Independent Telephone Association are in there pitching for the Independent telephone industry, here is the text of a pretty strong telegram sent from Tampa, Fla., on June 9 by Carl D. Brorein, president of the USITA, to E. R. Stettinius, Jr., director of priorities:

"Permit me to bring to your attention the serious situation confronting the Independent telephone industry growing out of restrictive priority rating of B7 on aluminum for civilian communication equipment. There are 6,500 Independent telephone companies not a part of the Bell System that operate 12,000 telephone exchanges mostly in small towns. Those companies in subscriber stations represent roughly one-fifth of the nation's entire telephone industry. Gravity of situation to telephone industry is accentuated by recent OPM statement that only 5 per cent of total aluminum supply can be used for all civilian purposes, and that telephone companies are being strongly urged to increase their facilities in order to enable wider telephonic coverage necessary under critical conditions affecting country. The B7 rating is seriously hampering our efforts. Will you not please reconsider present rating and make materially higher rating in harmony with indispensable nature of telephone communication? We also understand that copper and nickel are soon to be placed on priorities list and these two items especially copper are essentials in maintenance of existing telephone facilities as well as extension of plant to meet community communication requirements including many items directly concerned with defense."

(EDITOR'S NOTE: *During the past few months* TELEPHONY *likewise has been emphasizing the need of a higher priority rating for the telephone industry and has repeatedly reported the anxiety rising among operating men over the possible curtailment of telephone service because of impending shortages of equipment.)*

* * *

By way of cleaning up the week in Washington, here are three other developments of possible interest to readers of this department:

(1) A committee of the National Association of Railroad and Utilities Commissioners met with representatives of the FCC telephone bureau to decide on cooperative procedure in the telephone toll rate separation studies. Indications are that a plan will be devised whereby the NARUC will sit in and help out with the FCC's forthcoming investigation along this line.

There was some feeling among the NARUC members that they might not care to have any formula laid down by the FCC for toll rate structures and foreclose their own liberty of action, as state commissioners, in local cases. However, it is realized that the FCC is going to go ahead with toll rate studies—with NARUC cooperation, or possibly without it if necessary.

(2) Responding to efforts by the Washington representative of the USITA, the Wage-Hour Administration has softened its ruling on "sleeping time" within the meaning of wage-hour standards; also, its views on "incidental duties." As a result of such modification, there is less likelihood of misunderstanding about the application of exemptions of wage-hour standards to switchboard operators of small telephone exchanges, who are occasionally engaged in duties other than operating the switchboard and who sleep on the premises where the switchboard is housed.

(3) Rumor has it that certain defense authorities in Washington are not entirely satisfied with the emergency powers granted to the Federal government under Section 606 of the Communications Act. In its present form the government's priority powers over telephone and telegraph traffic cannot be invoked except during a period of declared belligerence. There is a feeling that this restriction is "obsolete." There is, of course, no argument about the actual cooperation which the government is now receiving from the telephone and telegraph industries. It is merely that certain officials would like to see the theoretical powers of the government ready for use in case of any emergency.

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Cable Splicing (Continued)

Clamps: Bonding Ribbon Clamp — To attach bonding ribbon to manhole walls.

Cable Clamps — To clamp cable and sleeves to masonry and wood. The proper clamp to use may be learned from Table 5.

Note: Cable clamps are designated by numbers indicating their size in sixteenths of an inch. For instance, a No. 11 cable clamp would be 11/16-inch, a No. 42, 2 5/8-inch, etc.

Table 5. Cable Clamps

CABLE SIZE					Masonry	Wood
19 Gauge (Pairs)	22 Gauge (Pairs)	24 Gauge (Pairs)	Cable Clamp Number	Size of Cable Clamp (Inches)	Size of Hammer-Drive Anchor (Inches)	Size of Strap Nail (Inches)
..	....	11	7	7/16	1/4 x 1	5/16 x 2
..	11 & 16	16	8	1/2	1/4 x 1	5/16 x 2
11	....	26	9	9/16	1/4 x 1	5/16 x 2
16	26	..	10	5/8	1/4 x 1	5/16 x 2
..	....	51	11	1 1/16	1/4 x 1	5/16 x 2
26	51	76	13	1 1/8	1/4 x 1	5/16 x 2
51	76 & 101	101 & 152	16	1	1/4 x 1	5/16 x 2
76	152*	202	19	1 1/16	1/4 x 1	5/16 x 2
101	202*	303	22	1 3/16	1/4 x 1	5/16 x 2
152	303*	404	25	1 5/16	1/4 x 1	5/16 x 2
202	404 & 455	455	30	1 7/8	1/4 x 1 1/4	5/16 x 2
303	606	606 & 909	35	2 3/16	1/4 x 1 1/4	5/16 x 2
404 & 455	909	1212	42	2 5/8	1/4 x 1 1/4	5/16 x 2

* If cable is silk and cotton insulated, use clamp of the next larger size.

Cloth: To protect openings in cable. Available in various size pieces—commonly 20 by 24-inch.

Compounds: No. 2 P and B compound—An insulating compound which is acid proof, waterproof, durable and elastic. To protect ends of cable, to paint cable forms, and to paint taped openings in cable. Available in pint, quart, half-gallon, and gallon containers.

Insulating Sealing Compound—For use in pot-heads, sealing chambers, boiling out cable forms and for filling insulating joints.

Dogs: Cable Dogs—To support stub cables on manhole walls at points where cable racks are not provided.

Cable clamps may be used for this purpose. However, if it is desired to use cable dogs, the proper size to use may be learned by consulting Table 6.

Table 6. Cable Dogs

CABLE SIZE			Maximum Outside Diameter of Cable (Inches)	Size of Cable Dog (Inches)
19 Ga.	22 Ga.	24 Ga.		
11	11	11	3/4	3/4
16	16	16		
	26	26		
	51	51		
		76		
26	76	101	1 1/8	1 1/8
	101	152		
		202		
51	152	253	1 3/8	1 3/8
76	202	303		
		354		
101	253	404	1 3/4	1 3/4
	303	455		
	354	505		
		556		
		606		
152	404	909	2 1/8	2 1/8
202	455			
	505			
	556			
252	606	1212	2 5/8	2 5/8
303	909	1515		
404				

Hooks: To support cables in manholes. Available in 4, 7 and 10-inch sizes.

Houseline: To lash cables and to support insulating joints hung from pipes. Available in one and five-pound balls.

Leather Stripping: To make insulating joints. Available in two-foot lengths, two inches wide and 1/8-inch thick.

Muslin: To wrap cable splices and to ventilate manholes. Available by the yard, 36 inches wide.

Nails: 5/16 in. by 2 in. strap nails—To attach cable clamps and straps to wood. See Tables 5 and 17.

Paraffin: To boil out splices, cotton tape, cotton sleeving, muslin, and to fill splices. Available in 11 and 20-pound cakes.

Pasters: Gummed cable pasters—To limit the width of wiped joints and soldered seams. Thirty-five-pound "kraft" paper strips, gummed. Available in rolls two inches wide and various lengths, usually on 60-foot rolls.

Table 7. Straight Splices — 19, 22, and 24 Ga. Cables

Size of Cable (Pairs)	19 Gauge		22 Gauge		24 Gauge	
	Diameter (Inches)	Length (Inches)	Diameter (Inches)	Length (Inches)	Diameter (Inches)	Length (Inches)
11 & 16	3/4	15	3/4	15	3/4	15
26	1	15	1	15	3/4	15
51	1 1/2	15	1 1/4	15	1	15
76	1 3/4	17	1 1/2	15	1 1/4	15
101	2	17	1 1/2	15	1 1/2	15
152	2 1/4	20	2	17	1 3/4	17
202	2 3/4	20	2 1/4	17	2	17
303	3 1/2	20	2 3/4	20	2 1/4	17
404	4	20	3	20	2 3/4	20
606	...	..	3 1/2	20	3 1/2	20
909	...	..	4	20	4	20
1212	...	..	...	..	4 1/2	20

Ribbon: Bonding Ribbon, copper, 3/8-inch wide, 1/16-inch thick, to bond cables. Available by the pound, approximately 18 1/2 feet to the pound.

Sleeves: Lead sleeves of inside diameter and length as indicated in Tables 7-13 are required to cover splices and openings in lead covered cables permanently. Under certain conditions it may be advisable to use sleeves slightly different from those shown in the tables. The sleeve should be large enough to fit snugly over the splice and three inches longer than the distance between the ends of the cable sheaths.

Tinned Copper Sleeves, to make soldered sleeve joints in cable conductors. Determine the proper sleeve to use from Table 14.

Fluorescent Lights For Exchanges

(Continued from page 11)

rooms. A single or double row of tubes may be mounted under racks in the runways between equipment bays. The 100-watt tubes are, in general, recommended for this purpose. Lighting of this type, properly installed, eliminates the need for bothersome and dangerous extension lights. This is true both around equipment bays, automatic or manual, and main frames.

The fluorescent light also may be used to advantage in battery rooms, storerooms, repair shops and offices. Small wattage lights may be mounted in dark corners, or in stairways, and kept lighted continuously at a low cost, doing much to eliminate the possibility of accidents. When tubes are operated continuously, rather than intermittently, they will ordinarily give service far beyond their rated life.

We do not intend that this article should infer that fluorescent lighting should immediately replace all older light sources which have proved efficient in the past on various applications. We realize fully that many of these systems have been installed at considerable expense, are in good condition, and will continue to give

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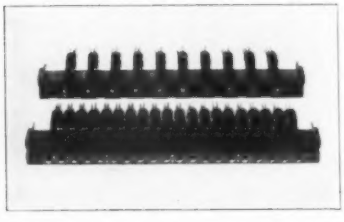

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[EDITOR'S NOTE: *We wish to thank the lamp department of General Electric Co. for the technical data on the fluorescent lamp used in this article.*]

▼ ▼

Nebraska Lays Plans To Protect Toll Lines

Announcement has been made by Director Weller of the Nebraska Highway Safety Patrol that, as a part of the national defense program, arrangements have been made with the American Telephone & Telegraph Co., Northwestern Bell Telephone Co. and the Lincoln Telephone & Telegraph Co., to cooperate in the protection of their toll facilities in Nebraska.

State patrolmen are to report any hazardous conditions they might find or any condition that might interfere with operation of telephone lines. They are acquainting themselves with locations where buried cable systems cross highways, and are paying especial attention to toll repeater stations. These stations are established at 17-mile stations, and maps, which indicate to each patrolman the location and direction of lines, have been furnished to patrolmen.

The prime purpose is to prevent sabotage or willful destruction of telephone property, and if patrolmen find any condition that looks suspicious they are to contact telephone company officials. Telephone companies are furnishing each authorized worker with a specially-designed identification card that also carries his face-and-shoulder picture.

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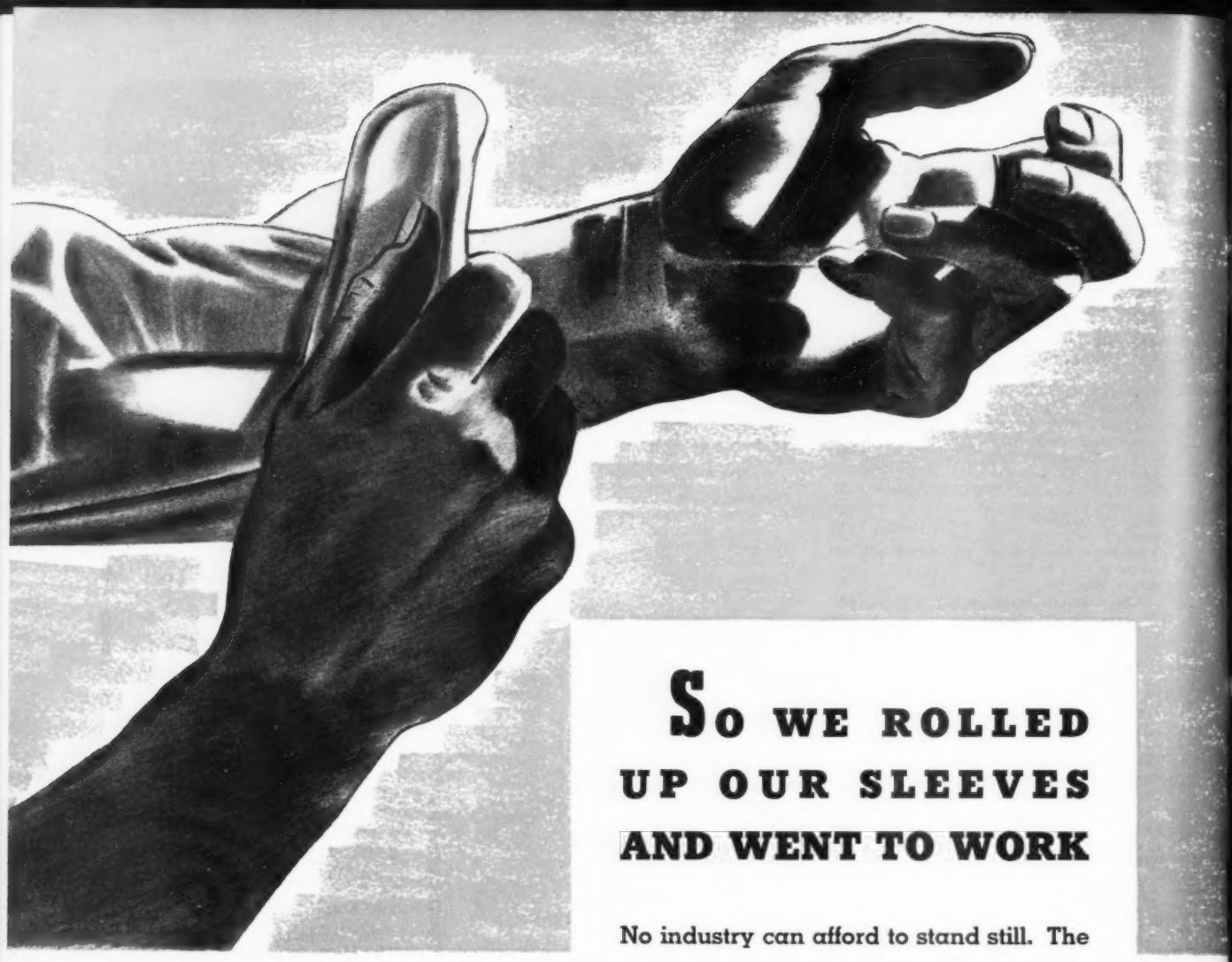

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